PAPER TRADE JOURNAL

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St. Helens, Oregon, Dec. 24, 1926

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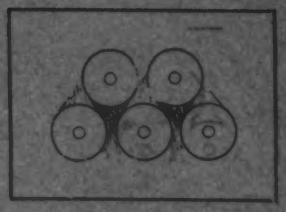

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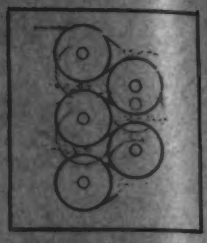

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ESTABLISHED 1872

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FIFTY-FIFTH YEAR

Published Every Thursday by the

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PAPER TRADE JOURNAL

With Which Is Combined

PAPER

Vol. LXXXIV, No. 9 — Thursday, March 3, 1927

The Magazine of the Paper Industry

Nicolet Paper Co. Buys DePere, Wis., Paper Mill

New Corporation, Started Several Weeks Ago, Secures American Writing Paper Co.'s Plant, to Manufacture High Grade Glassine and Grease Proof Papers—Necessary Changes in Mill and Equipment To Be Undertaken at Once—Production Probably Will Begin Early in July—Two Machines Will be Operated From Start

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., February 26, 1927.—Identity was given this week to the new owners of the American Writing Paper Company's mill at DePere, Wis., and previous rumors are substantiated in the reports. This mill was purchased at the sale of the American chain of mills in the east recently by the Nicolet Paper Company, a new corporation which was started several weeks ago with the name of the incorporators kept secret.

It was said at that time that men associated with the paper industry in the Fox River Valley were interested in the venture and that Henry C. Hanke, formerly of the Rhinelander Paper Company, Rhinelander, Wis., was the moving spirit in the deal. Mr. Hanke is vice president of the company and also is to be its general manager. He moved to DePere recently and has been in close contact with the mill ever since.

Directors of the company are H. K. Babcock, Neenah, Wis.; Mowry Smith, Menasha, Wis.; C. B. Clark and William C. Wing, Neenah; E. J. Dempsey, Oshkosh, Wis.; R. S. Powell, Appleton, Wis., and Mr. Hanke. At a recent meeting of the board W. C. Wing, president of the Fox River Paper Company, Appleton, was elected president. Mr. Babcock is the treasurer, and Mr. Dempsey, the secretary.

The reorganized industry will be capitalized at $750,000, with common stock of $500,000, and preferred stock of $250,000. High grade glassine and grease proof paper will be manufactured. It will be necessary to make changes in the mill and its equipment for this purpose, since high grade writing paper previously was manufactured. This will be undertaken at once under the direction of Mr. Hanke. It is believed that the alterations can be made so that production will be under way by July 1 of this year.

Purchasers of the mill include manufacturers of many years' experience and there is every indication that the mill will start under favorable auspices, abundantly capitalized. The location at DePere was looked upon with favor because the water supply is excellent on the Fox River, and the mill has access not only to main line railroads but also to vessels of the Great Lakes.

Two paper machines will be operated right from the start, and the old employees of the mill will be retained as far as possible.

Kimberly Mill Damaged

Damage totalling approximately $50,000 was caused by an explosion early this week at the Kimberly-Clark Company's mill at Kimberly, Wis. As the plant was idle at the time and only a few millwrights were at work, injuries resulted to only one man. He is John Lamers, millwright, who was thrown through a window and suffered a broken leg.

The explosion took place in the sulphur burning room and was caused by fire started by an acetylene torch in the hands of the workers. It is not known whether the blast was one of sulphur dust. Whole sections of brick wall were shattered and the blast broke many windows, not only throughout the mill but in the employees' hotel and other nearby places.

Damage was confined principally to the machine shop, laboratory, drafting rooms and offices. At least 150 window cases must be purchased to replace the damaged ones. Fires broke out at several points but were extinguished by the Kimberly fire department, with the aid of the city department from Appleton, Wis. Operation of the plant was suspended for about half a day in order to inspect the machinery, which did not eventually develop any damage. Repairs will be made at once.

Lawrence E. Nash Resigns

Resignation of Lawrence E. Nash as vice president and sales manager has been announced by the Nekoosa-Edwards Paper Company of Nekoosa and Port Edwards, Wis. He has been associated with the company for nineteen years, since its organization. His successor has not been named, and Mr. Nash himself has not announced his plans for the future.

Mr. Nash is vice president of the Wrapping Paper Manufacturers Service Bureau, New York, a member of the committee on distribution of the American Paper and Pulp Association, and a director of the Wisconsin Paper and Pulp Manufacturers Traffic Association, Chicago.

When the General Paper Company first was organized in Chicago in 1900, Mr. Nash was among its employees. He later returned to Port Edwards when the Nekoosa-Edwards Paper Company was organized, and took over the John Edwards Manufacturing Company, the Centralia Pulp and Water Power Company and the Port Edwards Fibre Company. He had been selling these products with the Chicago concern. Mr. Nash was made sales manager, was elected a director of the company in 1920, and a vice president in 1924.

Menasha Mills Begin Production

Production is finally under way at the plant of the Menasha Paper Mills Company, Menasha, Wis., formerly the Island Paper Company. After weeks of work overhauling the defunct plant, the machines began turning out straw board. One machine is

(*Continued on page 68*)

Paper Demand Falls off Slightly in Chicago

Purchasers Reported to be Strictly Adhering to Hand-to-Mouth Methods of Buying for Immediate Requirements—Manufacturers Keep Output Just Ahead of Consumption—Prominent Box Makers Adopt Five Day Shift to Guard Against Over Production

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., February 28, 1927.—The National Paper Trade Association Convention in New York had some distressing temporary effects on the Chicago market during the past week, both in point of business and in news items. The majority of the executives of Chicago jobbing houses were out of the city and mill representatives also availed themselves of the opportunities offered by a trip to New York. In the Conway Building, a veritable nest of paper representatives, nearly all offices were operating without the presence of executives.

The paper men at home all reported slack business conditions and all of the fault was not to be found with the absence of some of the major cogs in the industry. Business has failed to respond as rapidly as it should, and every representative is finding it increasingly hard to get orders, both because of stiff competition and some overproduction that buyers are not taking up. The demand is spotty, ruling good for a few classes of paper, and slow for others, although the aggregate volume is not so slow as to cause alarm. There is a consistent demand, although buyers are still strictly adhering to the "hand-to-mouth" methods of buying only for absolute requirements. The mills, well equipped and anxious to run at all times, are keeping production a little in excess of demand, and prices are still consequently so low as to deprive the majority of the classess of paper dealers of a good fair margin of profit.

News Print Situation in Chicago

Last week's reports of some low prices quoted in Canadian news print, although partially discounted, seem to persist and, in the light of this persistence it seems fair to quote from statements made by several jobbers and mill representatives. The substance of their reports is that "there is and has been for some little time, an appreciable quantity of news print unloaded in Chicago at a figure low enough to demand attention. Some of those interviewed go further and say that "if kept up, the lower figures would force a universal lowering of prices in this item." The condition was brought about by over production, and Chicago is receiving its share of these low prices, and some business has been done at these figures. It may be true that this is only a recurrence of the spot buying of news print that usually occurs annually when some publisher finds himself just a little shy of paper and in no hurry to fill the order. By shopping around he sometimes creates a little stir. However, the situation is interesting enough and important enough to demand attention from a number of Chicago paper men.

Over Production of Paper

Over production in paper may cause paper men to model their steps after box manufacturers, according to opinions voiced during the past week. Although no one can prevent the paper field from becoming overcrowded there is a tendency to provide some means of alleviating an over large supply. Box manufacturers met this overcrowded and over produced condition by acting independently and causing their mills to work on a five day shift. The box mills that have made a study of supply and demand affirm that they can make enough boxes to take care of the demand in the United States in a five day shift, and that this regulation at least partially insures them against over production, and the consequent lowering of prices, and gives them an opportunity to collect a fair profit. This independent action by some prominent members of the box manufacturing industry may, in the future, have to be applied to the manufacture of paper if no other methods are suggested soon. Some readjustments will have to be made and if not in this way then mills will have to switch from making certain kinds of paper to the manufacture of a paper that is not made in such large quantities.

Kraft Liner Position

According to reports received in the Chicago market during the past week demand for a new kraft liner used in the manufacture of corrugated shipping containers has quieted down to such an extent that many of the mills engaged in its manufacture either have or will have to shift their endeavors to some other grades until buyers have become more educated to the use of the new product. The kraft liner is an exceptionally fine one, according to all reports, and there seems to be no question but what it will be ultimately a big and prominent item in the making of shipping containers. In fact, so good did the product look that so many mills undertook to make it that they now find themselves with more on hand than buyers can take up for some time. The kraft liner is a little higher priced than buyers have been accustomed to but it is believed that eventually its merit will overcome that objection. Until then, mills may be forced to divert their efforts into other channels.

Envelope Makers Meet

The Envelope Manufacturers Association held a very successful meeting at the Blackstone Hotel, Chicago, February 17 and 18. The two day discussions that were partially opened to paper men of the city of Chicago were well attended by local representatives and, although complete reports of the convention are not available at this writing, many items of interest relating to the manufacture and distribution of this product were discussed. One of the feature events was the joint meeting with the mill men held on the afternoon of the 17th. It was followed by a family dinner that evening.

New Box Board Package

The Miller Fibre Products Company, Chicago manufacturers of paper box containers, are supplying a new and attractive round package box to the Pabst Corporation, Milwaukee, for use in packing their cheese products. A similar package has been used in Europe for packing cheese for some time and it is reported that Georges Carpentier, who once had aspirations for the heavyweight boxing crown of the world, made most of his fortune from mills that supply this product. The box is made of high grade box board and its pie-shaped characteristics are said to bring about more sanitary conditions and add much to the attractiveness of the product. It is expected that, following this new use of box board by the Pabst Corporation, other firms will make use of it and another market will be definitely created for box board as used for package and shipping containers.

Harbor Plan Vital to Paper Industry

The Harbor Plan of Chicago, the agency of the Commercial Club engaged in studying Chicago's harbor requirements, has completed preliminary investigations of character and volume of potential water-borne traffic in the Chicago region, and is now at work investigating the possibilities of several locations for harbor development. Several plans for enlarged harbor facilities at the mouth of the Chicago river have been presented. Similar studies are to be made of practicable developments at other locations. The progress made in this development is of extreme

importance to Chicago paper men as well as to those in other industries. The advantages of a direct waterway to the Gulf for Chicago transportation will also be found in costs of shipping, prices and general market conditions.

O'Neil Ryan, Jr., Promoted

O'Neil Ryan, Jr., has been promoted to the position of assistant general sales manager of the Celotex Company, 645 N. Michigan avenue, Chicago, manufacturers of insulation and building board.

W. J. Cox Recovering

Walter J. Cox, Chicago manager of the Paterson Parchment Paper Company, has been very ill with appendicitis and although he is recovering in good shape it is expected that he will have to remain in bed for at least six weeks. Mr. Cox is well known in Chicago paper circles, and is actively identified with the Chicago division of the Salesmen's Association of the Paper Industry.

Ross P. Andrews Asks For Receiver

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., March 1, 1927.—Ross P. Andrews, president of the R. P. Andrews Paper Company of Washington and York, Pa., has asked the Supreme Court of the District of Columbia to appoint a receiver to conduct the business of the corporation. Mr. Andrews declares the corporation is absolutely solvent having assets of $848,919.13 and owing only $696,407.93, in addition to its capital stock of $100,000.

Because of circumstances, the court is told, the company finds itself embarrassed in its inability to pay its present obligations without greatly sacrificing its real estate or other holdings. Unless the court intervenes and names some one to carry on the business, the plaintiff says, the company is threatened with disaster, and further prosecution of business under existing conditions will lead to serious loss to its creditors as well as to stockholders.

With the court taking over the administration the belief is expressed by Mr. Andrews that all creditors will be uniformily protected and the stockholders safeguarded against loss.

Mr. Andrews says he owns 771 shares of the capital of 1,000 shares and that there are 11 other stockholders, most of them residents of the District. The creditors of the company are scattered throughout various parts of the United States, the court is advised.

Justice Jennings Bailey took the application under advisement. Maurice D. Rosenberg is counsel for Mr. Andrews.

As is well known to his friends, Mr. Andrews stated today he had been in ill health for some time and his business had been practically running itself, the merchandise stock having been increased to such an extent that it caused stringency in cash. He petitioned for a receivership, he explained, in order that he might not be interfered with in getting the business in proper shape. About 75 per cent of the creditors, Mr. Andrews said, had joined him in asking the court that he be appointed the receiver.

The R. P. Andrews Paper Company, has been in business here about 35 years.

J. C. Montie Goes With St. Regis

John C. Montie of Millinocket, Me., for many years connected with the Great Northern Paper Company, has been announced by Corwin T. Jewell, general manager of the St. Regis Paper Company, as assistant general superintendent of the company, in charge of the upper group of mills at Norwood, Norfolk and Raymondville. This is what is known as the Hanna group. Mr. Montie has had long experience in the paper industry with the Great Northern company and for the last seven years has served as superintendent at the Millinocket plants.

In connection with the northern group of mills there is also a pulp wood terminal at Waddington where thousands of tons of Canadian pulp are annually received. There is also a pulp plant at East Norfolk.

Rexpulp Organization Plans

John M. Hart, vice President and General Manager of the Rexpulp Company, Inc., of Chicago, Ill., a company recently formed for the manufacture of pulp products by a new process, and also improved pulp molding machinery, advises that his company has received so many responses from interested parties desiring to secure the location of the company's new plants in their respective territories, that the matter of selecting a definite location for a new plant will be made about April 1.

The selection of the location for the new plant is now dependent largely on whether other grades of pulp than ground wood will be suitable for their purposes, and it is the desire to have their plants located as closely as possible to the source of raw materials.

The Rexpulp Company, Inc., has been organized without any bonded indebtedness or borrowed capital, and in view of the large market which exists for their products its success seems to be assured from the outset.

The Rexpulp Company, Inc., are manufacturers of machinery for making paper pie plates and picnic plates. Merle P. Chaplin, inventor and chief engineer, is also secretary of the Rexpulp Company, Inc. Mr. Chaplin was for a great many years in the mechanical department of the Keyes Fibre Company, of Waterville, Maine, manufacturers of Papyrus pie plates. Mr. Chaplin invented many improvements in their machines, on which he took out patents, which he assigned to the organization during his employment there. He is a member of the Technical Association of the Pulp and Paper Industry, of the American Society Mechanical Engineers, and was for many years connected with the engineering department of the Bell Telephone Laboratories, Inc., subsidiary of the American Telephone and Telegraph Company, and the Western Electric Company. The inventions of Mr. Chaplin are protected by patent rights or patent applications in the United States and foreign countries.

Huge Power Developments

The Gatineau Power Company, a subsidiary of the International Paper Company, has during the week acquired two new electric power plants in the Ottawa district at a cost of $350,000, and with existing power capacity of 600 and 1,000 hp. The Bonhomme electric power plant on the Blanche River, with a present capacity of 600 hp., was purchased for $100,000. The Papineau Electric Company's plant at Papineauville, on the Ottawa River, with a capacity of 1,000 hp., was purchased for $250,000. By the purchase of these two plants the Gatineau Power Company has acquired important rights on the Blanche, Ottawa, and Nation rivers.

The announcement is a reminder of the progress which is being made in the huge work for the developments of power by the company on the Gatineau River. Under an arrangement with the company, the largest water storage dam in the world is being built on the river, about 125 miles north of Ottawa, under the auspices of the Quebec Streams Commission, and the work is so far advanced that it will be completed next month. The dam will impound 95,000,000,000 feet of water. It will cost $10,000,000, and will form a lake 110 square miles in area. Two years ago this huge undertaking was unthought of. Surveying started in September, 1925, and was completed by Christmas of the same year. Construction was started immediately, and now, thirteen months after the construction gangs started to work, the dam is approaching completion in time to impound the spring floods. The dam will increase the flow of the Gatineau River from 2,500 to 10,000 cubic feet per second, and will make possible the development of nearly 750,000 hp. between the dam and Ottawa. Two big dams have been constructed on the river lower down, one at Farmers Rapids, and one at Chelsea, the site of the International Paper Company's huge new mill.

Manitoba Paper Co. Secures More Timber Limits

Additional Grant by Government Will Enable Organization To Increase Its Capacity by Addition of Second News Print Machine—Will Provide for Ultimate Capacity of 300 Tons Daily—Ottawa River Power Rights in Demand

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., March 1, 1927.—It is expected that a spectacular feature of the present session of the Federal Parliament will be the fight over the Ottawa River power at Carillon, arising out of private legislation. Two interests—the Sifton Georgian Bay Canal Company and the National Hydro Company were originally after the rights in question, the one relying on its present charter, now sought to be extended, and the other upon certain leases from the Dominion and contracts with the Quebec and Ontario Governments. Now, it is stated that the International Paper Company, which has large developments on the Gatineau River, is also seeking the Carillion Rapids, while a fourth Montreal group of affluence has a similar ambition. There is a possible development of some 300,000 h. p. involved. It is claimed that parliamentary legislation on the subject, while putting the interest in a position to secure concessions on the basis of the chartered rights will not, by itself, transfer the valuable utilities There is every indication of a lively fight.

Development of Manitoba Paper Co.

Under an order-in-council the Manitoba Paper Company has been given the right to select 4,000,000 cords in additional pulpwood limits on the east of Lake Winnipeg. Under its preceding contract with the government, the company acquired 2,000,000 cords. The additional grant will enable it to increase its capacity to 200 tons daily by the addition of its second news print machine, annd will provide for an ultimate capacity of 300 tons daily. The matter of the acquisition of further limits by the company was made the subject of many negotiations and brought about many discussions between the company, the Backus-Brooks interests, the federal government, the city of Winnipeg, and such bodies as the Winnipeg Board of Trade and Industrial Development Board. The feature of the situation was that the Backus-Brooks interest declared their willingness to erect a paper mill just outside Winnipeg at a cost of over $10,000,000, provided that surveys indicate, there was not sufficient limits near enough to provide a source of raw material for both companies. The *Manitoba Free Press*, by the way, recently celebrated the opening of the plant of the Manitoba Paper Company, by turning out the first newspaper to be printed on Manitoba news print.

Abitibi Co.'s New Purchase

It is understood that the Abitibi Power and Paper Company will issue $4,000,000 in 6 per cent short term notes to finance its purchase of the Abitibi Fibre Company. Such an issue would increase Abitibi's funded debt to about $13,000,000. The rated capacity of the Abitibi Fibre Company's plant is from 50,000 to 60,000 tons of high grade sulphite per annum, half of which is bleached. It will be a conservative estimate to say that the management will make its machines produce at least 60,000 tons this year. Coupled with this is the general belief that the sulphite pulp market during 1927 will be at least as satisfactory as in 1926. Thus, it is safe to make a guess that earnings during the current year will show as great an increase as they did in 1926.

The acquisition means that Abitibi now has a diversification in its output. Later on in the year, should there be a further slowing up in the news print demand, the company, not having all its eggs in one basket, should have a more stabilized earning power. Then again, it is ultimately intended, to add a news print mill to the Abitibi Fibre's plant. This would work out more economically than erecting a news print mill on a new site. First of all, because the necessary sulphite capacity is there and secondly, wood-handling and log-driving equipment is ready to take care of the increased demand for pulp wood. Incidentally, the parent company's Island Falls power plant generates sufficient power to take care of any expansion on the part of its subsidiary. Electric power is now being used for steam purposes in the mills of the parent organization. The subsidiary company will not, however, go ahead with its news print development until economic conditions warrant such an expansion.

Order Placed for Machines

The Dominion Engineering Works, of Montreal, have secured an order for two news print machines for the new mill of the Lake St. John Power and Paper Company at Mistassini, Que. R. O. Sweezey, forest consulting engineer of Montreal, says the Lake St. John Power and Paper Company has the cheapest logging costs in Eastern Canada, and that these low costs can be maintained indefinitely.

Fraser Companies' Statement

The consolidated annual report of the Fraser Companies and the United States subsidiary for the year 1926 shows a decided improvement in earnings. These amount to a net of $1,561,825, as compared with $1,133,071 in 1925, and was equivalent to 3.8 times the amount distributed on the preferred shares.

In his report to the shareholders, Archibald Fraser, the president, said in part as follows:

"Reasonably satisfactory sulphite pulp and fine sulphite paper markets prevailed during the year, which enabled both pulp and paper mills to operate practically at capacity. In spite of unfavorable market conditions in the lumber business, the lumber department has been operated at a profit. Your management is making a determined effort to improve the quality of pulp and paper production, and has made substantial progress in this regard. Due to improving quality, and given a continuance of present or better conditions, it is expected that pulp and paper profits for the coming year should be even more satisfactory than those in the past.

"The policy of maintaining adequate reserves against depreciation of fixed assets and depletion of timber areas has been adhered to, there having been written off out of profits as at the date of the appended balance sheet, reserves under these headings amounting to $4,200,194.54."

Oxford Miami Paper Co. Improvements

DAYTON, Ohio, March 1, 1927.—The Oxford Miami Paper Company of West Carrollton is making a number of substantial improvements since it passed into new hands. Hugh J. Chisholm, widely known Eastern paper manufacturer having some time ago acquired control of the concern.

This mill with its several machines, is one of the largest in the Miami Valley, and makes a high grade of paper.

While the complete program of the company in installing mill improvements cannot be stated at this time, it is believed they have just been started. The first addition is that of a bleaching plant at the south end of the mills which stretch along the Dixie highway, seven miles south of Dayton, for some distance.

W. W. Sunderland who has been the president of the Miami Paper Company, is interested in the new tablet and stationery combination of which he now is the head.

Toronto Paper Expects Revival in March

Following an Excellent Request Early in February, Wholesale Paper Organizations Report That Orders Fell Off Towards End of Month—Lower Grades of Bond Papers Decline, Affected by Lighter Demand—Paper Bag Situation Improving Gradually

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., March 1, 1927.—February proved a rather disappointing month to a number of wholesale paper concerns. The month started off well, with a considerable volume of business ahead of last year but, during the last few days, there was quite a drop in demand. There has been a decline of about five per cent in the lower grades of bond papers, and consumers have not been buying freely, evidently being of the opinion that there may be another fall in prices in the near future. Just a year ago there was an increase in quotations on some lines of fine papers which caused quite a flurry in purchasing at the end of February, dealers being anxious to stock up.

It is the experience of the trade that, when a shading off in values is forthcoming, there is a noticeable drop in orders for a few weeks; no one cares to go ahead beyond the most immediate wants, on a falling market. There are no other changes of note in the trade during the past few days and March is expected to see a revival of business.

The paper bag situation, which has been in a demoralized condition for some time, is now much better, as there has been a raise of five per cent and things are on a better price basis, so jobbers report. All the mills continue busy and are looking forward to continuous activity.

The sulphite pulp market shows some weakness, but it is thought that this is only seasoned, and that firmness will characterize the situation again in the near future.

for milling purposes, and the consent of the government will have

Paper Mills Interested in Water System

The paper mills of Thorold and Merritton are somewhat concerned in the fact that excavation operations for the new filtration plant at Thorold have been stopped by the authorities of the Welland canal, acting for the Department of Railways and Canals, Ottawa, on account of the land being government property. The land is at present leased by William Monroe from the government for milling purposes ,and the consent of the government will have to be secured before construction of the filtration plant, on which the paper mills will depend for a pure supply of water, can be proceeded with.

Shareholders Will Retain Equity

It is understood that the earnings of the Dryden Paper Company, of Dryden, Ont., are showing a decided increase, and that the company has been able to pay off all the prior obligations incurred by the receivers. Some years ago there was the fear that the shareholders in the company might lose their entire equity, but this danger seems to have passed away. The market for the output of the Dryden Company is naturally in Eastern Canada, and improving business conditions there have made themselves felt in the income account. During the past two years the market for sulphate pulp has also been maintained at a satisfactory level, with a resulting benefit to the Dryden Company, its bondholders and shareholders. It now seems reasonable to presume that the company may pass out of the receivership during the current year.

Paper Company Will Build Docks

Urging immediate action, the Port Arthur City Council has passed a resolution requesting the Dominion Government to arrange for the dredging of a slip into the site of the new Thunder Bay paper mills. The paper company will erect a series of docks upon which will be handled its limestone, sulphur and coal imports and its paper and pulp exports. It is proposed to commence erection of the wharves early in the spring and have them completed in time to handle all products of the mills, which, it is expected, will be operating in the fall of the present year. The foundation work will require a large amount of piling and, when completed, the wharves will handle tonnage estimated at 800,000 tons per year, valued at $10,000,000. It has been estimated the dredging will cost about $150,000 and the other work in the neighborhood of $100,000. The Thunder Bay Company's entire investment in Port Arthur, with the new wharves, will be in the neighborhood of $10,000,000 and the annual pay-roll in mills and woods will be $1,000,000. The Port Arthur Chamber of Commerce is forwarding a similar resolution asking for the dredging to the Government.

Conferring on Trade Matters

F. W. Brown, of Montreal, and Fred W. Halls, of the Fred W. Halls Paper Company, Toronto, representing the Canadian Paper Trade Association, recently met a committee of the sixteenth district of the Typothetae in which the one thousand sheet count and the "long price list" were discussed. No definite action was taken as a result of the conference and another will be held in the near future.

New Method of Shipping Paper

A number of paper mills in the Niagara district have adopted the method of shipping book paper which has been in vogue across the border for some time. The system provides for the piling of the paper on a platform and screwing the paper down tightly. Platform and stock are then placed on trucks and transferred direct to the car, being shipped in this way to customers in the larger centers. While this plan is somewhat more expensive than the ordinary method of packing and shipping, the extra outlay is offset by the splendid condition in which the paper reaches the press rooms of large printing concerns and by the fact that the stock is not damaged in transit.

Will Build Its Own Power Plant

E. A. Wallberg, Toronto, who is head of the Lake St. John Pulp and Paper Company, states that this organization expects to spend in the neighborhood of $8,250,000, before they start to ship a pound of paper toward the close of the present year. At present a paper mill, with a capacity of 200 tons of news print per day, staff houses, hospital, offices and several other houses, are being built by the company, which recently had the name of their new town, Mistassini, changed to Dolbeau, and when these are all completed, the work of manufacturing paper will actively get under way. The company is buying its electric power from the Duke-Price Company, but next year it will harness two series of rapids which flow along the company's property, and will build its own hydro-electric station.

Notes and Jottings of the Industry

C. Howard Smith, head of the Howard Smith Paper Mills, Montreal and Toronto, has returned from an extended trip to France, Italy, and other parts of Europe, and is greatly improved in health.

John Hewitt, President of Paper Sales, Ltd., Toronto, spent the past few days on a visit to Eastern Felt and Paper Mills, at St. Basile, Que.

George R. Gray of the Spanish River Pulp and Paper Mills, Sault Ste. Marie, and Mrs. Gray, were in Toronto lately on their way to the sunny south, and will spend some time in Georgia.

Roderick Olzendan, formerly secretary of the Industrial Rela-

(*Continued on page 70*)

Growing Spruce For Pulpwood in Northeast*

By Samuel T. Dana, Director, Northeastern Forest Experiment Station.

During the past three years the Northeastern Forest Experiment Station has devoted considerable attention to determining what results have followed cutting on spruce lands and also what yields may be expected from fully stocked, even-aged stands of spruce such as are characteristic of many old fields in the region. This work has been handled chiefly by M. Westveld and W. H. Meyer, and has involved the establishment in Maine, New Hampshire, Vermont, and New York of over 400 temporary sample plots on areas cut over from two to fifty years ago; and of approximately 200 plots in even aged spruce stands varying from 25 to over 100 years of age. This paper is based on the information obtained in connection with these studies so far as this has already been analyzed.

Bulk of Spruce in Northeast

The bulk of the spruce in the Northeast occurs in the spruce flat and spruce and hardwoods types, with the spruce slope type also playing an important part in portions of the region. The Station's studies have been concentrated chiefly in the first two types. In these a satisfactory amount of spruce and balsam fir reproduction is usually present prior to cutting. This is not always true, however, and in places, particularly where hard maple and beach are abundant, softwood reproduction may be scarce or almost entirely lacking. Hardwood reproduction is also almost invariably abundant in the spruce and hardwoods type, with much smaller amounts present in the spruce flat type.

The present prevailing method of logging is to cut the spruce to the lowest merchantable diameter, usually about five or six inches at breast height. Hardwoods are seldom taken except in the comparatively rare cases where there is a good market for them. The result of this method of cutting is to leave the relative amounts of the different species practically the same in the spruce flat type, and to increase greatly the relative amount of the various hardwoods in the spruce and hardwoods type. It is thus evident that even heavy cutting is not likely to decrease very materially the relative amounts of spruce and balsam fir in the succeeding stand, provided satisfactory reproduction is present prior to the cutting. On the other hand, heavy cutting of conifers in the spruce and hardwoods type is almost certain to increase very materially the proportion of hardwoods in the succeeding stand, even where an ample supply of spruce and balsam fir reproduction is already on the ground. The great problem from a silvicultural point of view is how to prevent this encroachment of the hardwoods.

Several Measures May Be Taken

When removal of the mature hardwoods is impracticable for economic reasons at the time the spruce is cut, there are several measures which can be taken to favor the spruce and balsam fir subsequent to the cutting. Of these, the girdling of the remaining hardwoods has, perhaps, been the most discussed, and several experiments in this direction have been undertaken by private companies. Those of the Finch Pruyn Company will be described later by its forester, Mr. Churchill. From these experiments, and from the development of coniferous reproduction where the hardwoods have died or been cut subsequent to cutting, it seems probable that this method may prove both silviculturally and financially desirable under certain conditions. It is, however, important that the method should be applied with considerable judgment and should be limited to the removal of unmerchantable hardwoods which are clearly supressing valuable spruce and balsam fir reproduction capable of rapid recovery if realeased. Indiscriminate girdling of hardwoods on cut-over areas can certainly not be recommended. In many cases it will probably prove desirable to defer girdling until several years after the cutting, in order to be more certain as to whether or not the hardwoods are going to die naturally, and as to the location of the most abundant and most thrifty reproduction.

Another Measure Worth Considering

Another method well worth consideration is the lopping back of the younger hardwoods from a few feet in height up to an inch or two in diameter. Where hardwood reproduction of this character is abundant, it ordinarily develops very vigorously after logging and may result in crowding out the great bulk of the coniferous reproduction. This is particularly true with hard maple and breech, with which spruce and balsam firm are able to compete much less successfully than with yellow or paper birch. Lopping back of the latter would undoubtedly favor the conifers, but dos not seem to be really essential to permit them to survive and eventually to occupy an important place in the new stand. Very little, even of an experimental nature, has as yet been done in this direction, so that accurate figures as to costs and increased growth are not available. Judging from similar work in the white pine type, however, the costs should vary from approximately $2 to $6 per acre, depending upon the amount and size of the hardwoods to be lopped. Observations of spruce seedlings under a dense canopy have shown a height growth of only 20 inches in 12 years as against a height growth of nearly 6 feet in the same period where the overhead canopy had been entirely removed. Approximately similar results should be obtained from the cleaning out of the competing hardwood reproduction.

A Measure Suggested With Hesitation

Another method of favoring the coniferous reproduction, which should perhaps be suggested with some hesitation, because of the danger of overdoing it, is grazing. It is, however, quite evident that grazing, both of cattle and of sheep, has in the past been responsible for greatly increasing the amount of conifers present in the new stands. This has perhaps been particularly marked on old fields where the even aged stands of pure spruce are due chiefly to the fact that hardwoods have been kept back by grazing. There can be little question that this method is effective in favoring the conifers, provided it is not carried to the point where they too are trampled or browsed back by the grazing animals. Some damage of this sort is probably inevitable, but where the grazing os properly handled will be more than counter-balanced by the increased amountof conifers.

In both the spruce flat and the spruce and hardwoods type balsam fir is relatively more abundant than spruce in the new stands. Balsam fir seedlings respond more quickly and grow more rapidly following liberation than red spruce. Balsam fir seedlings will put on a height growth of 88 inches in 11 years as against 68 inches for red spruce seedlings of equal height at the time of release. Red spruce is, however, more tolerant and more persistent than balsam firm and it seems probable that it will eventually gain materially in numbers on the latter. Nevertheless, the prospects indicate a considerably larger amount of balsam fir in the stands following present methods of cutting, even when such measures as girdling of the older hardwoods or lopping back of the younger are practiced to favor the conifers.

More Rapid Growth

The most rapid height growth in the coniferous reproduction occurs with seedlings from two to six feet in height at

* Delivered at annual meeting of Woodlands Section of the American Paper and Pulp Association.

the time of cutting. These respond much more vigorously to release and should therefore be favored in every way as important parts of the new stand. Unfortunately present logging methods result in the destruction of nearly 25% of the reproduction of all size classes. This destruction is particularly marked in the three and four foot height classes of spruce and balsam fir. It is important that every effort should be made to reduce this destruction of the most valuable portions of the future stand.

Slash following logging usually covers nearly two-fifths of the cut-over area. Approximately half of this is so dense as to interfere with the development of the reproduction already on the ground. This is particularly true of spruce and balsam fir slash in large piles or windrows, which effectually prevent for a period of at least 12 to 15 years the development of any reproduction on the areas covered by them. The burning in small piles during the winter as logging progresses, of dense spruce and balsam fir slash is therefore an important measure from the standpoint not only of fire protection, but of securing reasonably stocked stands. Such burning usually costs approximately $1.25 per thousand board feet. The burning of light coniferous slash is hardly necessary from the silvicultural standpoint, but may be desirable as a fire control measure. Hardwood slash decays so rapidly that its disposal is hardly essential.

Damage by Spruce Bud Worm

The damage done by the spruce bud worm during the last ten to fifteen years emphasizes the importance of taking every possible means to prevent future outbreaks. The most feasible method so far suggested for doing this is to keep a sharp lookout for places where the bud worm is becoming active and to cut these out before an epidemic is started. Mixed stands also help greatly to reduce bud worm damage and are distinctly desirable from this point of view.

Where reproduction is abundant prior to cutting, the actual method of cutting used to remove the mature stand is less important than the measures subsequently taken to favor spruce and balsam fir by reducing competition of the hardwoods. Where abundant advance reproduction is not present, clear cutting usually results in leaving the area only partially stocked or in abandoning it to the hardwoods. The latter reproduce abundantly after cutting where seed trees are present, while spruce and balsam fir reproduce very slowly after heavy cutting even with seed trees present. Where advance reproduction is scarce, it is therefore important wherever practicable to open up the stand gradually so as to obtain spruce and balsam fir reproduction, prior to the removal of the bulk of the stand.

Seed Bed Conditions

It is evident that seed bed conditions play an important part in determining the character of the reproduction. Sufficient study of this point has not yet been made to permit the drawing of any very definite conclusions, but it is quite evident that the soil conditions in spruce stands change rapidly within comparatively small areas. Drainage plays an important part in determining the character of the soil and its suitability for conifers and hardwoods. The latter require well-drained, aerated soils of good depth which offer no serious obstacle to root penetration. The preponderance of spruce and balsam fir in the spruce flat type is due to their ability to thrive in soils not particularly suited to their hardwood competitors. They thrive even better in the soils characteristic of the spruce and hardwoods type and are less abundant only because of the competition of the hardwoods.

Remarkably High Yields

Studies of even-aged, fully stocked second growth spruce stands have shown for the small areas included in the plots remarkably high yields. At 65 years of age, when the maximum average increment is reached on most sites, the yield per acre of peeled wood runs from 50 cords per acre on sites of medium quality to 80 cords per acre on those of best quality. Considering the fact that it requires an average of 15 years for trees in such stands to reach a height of 4½ feet, these figures show extraordinary growth after the spruce has become thoroughly established. Such yields cannot of course be expected on poorer sites, or in stands which are only partially stocked. They do, however, indicate the possibilities in the way of increased yields as a result of more intensive management, such as increasing the amount of spruce and balsam fir by lopping back of competing hardwoods. Thinning of densely stocked young and medium aged stands would also almost certainly result in giving even larger yields than these actualy found. This is another phase of forest management to which little attention has so far been given, but which may prove of great importance, particularly wherever there is any possibility of using the material removed in the thinnings.

Growth on cut-over areas of course varies greatly depending upon the amount of spruce and balsam fir reproduction and upon the amount of competition from the remaining mature and young hardwoods. In general, spruce and balsam fir yields on such areas apparently vary rather consistently with the total basal area of the hardwoods present. A very preliminary analysis of the data obtained on this point indicates that an average growth of at least 15 to 20 cubic feet per acre per year of spruce and balsam fir can be expected on average spruce and hardwood land during the first 40 years following cutting. There is hardly any question that this could be at least doubled by lopping back of the competing hardwoods and perhaps by a limited amount of girdling of over-mature trees where conditions for this are particularly favorable.

Methods of Management

As to methods of management, emphasis should be laid on the importance of obtaining adequate reproduction of spruce and balsam fir prior to heavy cutting; on the importance of adopting measures to relieve the spruce and fir reproduction from serious hardwood competition during the first few years following cutting; on the importance of protecting from logging damage and of releasing from hardwood competition the spruce and fir seedlings from 2 feet to 6 feet in height which have the best possibilities for vigorous growth; and on the greatly increased yields of spruce and balsam fir which may be expected as a result of even comparatively small efforts to protest and favor them at the expense of the hardwoods. It is also important to emphasize the fact that each tract presents a problem in itself, and that it is impossible to lay down any hard and fast rules which will be generally applicable. Both soil conditions and forest conditions vary so widely that each tract must be considered by itself and the desirable measures in forest management determined by a forester with judgment and experience.

F. L. Brown Heads Kalamazoo Cost Chapter

[FROM OUR REGULAR CORRESPONDENT]

KALAMAZOO, Mich., February 26, 1927.—F. L. Brown, of the Michigan Paper Company, Plainwell, was elected president of the Kalamazoo Valley chapter of the Cost Association of the Paper Industry, at a meeting held Wednesday evening, in the Columbia Hotel. Elbert Milham, of the Bryant Paper Company, was named vice president and Harry C. Bradford, of the Rex Paper Company, was continued in the office of secretary-treasurer. The program committee for 1927-28 is Elbert Milham, Harry C. Bradford and Frank Libby.

Wednesday evening's program, following dinner, was an excellent one. Frank Whittiger, of the General Dye Stuff Corporation, gave a paper on "Colors, Their Use and Control in the Beater." James H. Barrett, of the Kellogg Company, Battle Creek, discussed "Accounting for Depreciation and Standard Cost." A. C. Dreshfield of the Western Paper Makers Chemical Company, handled the topic "Short Cuts in Mathematics."

Wisconsin Paper Mills Have Successful Year

Wisconsin's paper mills, as a whole, have had a very successful year, and the outlook seems just as promising for the year 1927. Manufacturers generally are very optimistic and expect capacity production and prices that will mean satisfactory profits.

Indications of Prosperity

Some of the encouraging signs are the payment of dividends on both preferred and common stock by the Northern Paper Mills, Green Bay, Wis., for the first time in five years; also the resumption of operations by one of the defunct mills of the Fox River Valley, the former Island Paper Company, Menasha, Wis. This mill was purchased by a new corporation known as the Menasha Paper Mills Company.

Another indication of prosperity is an announcement by the Fox River Paper Company, Appleton, Wis., that production in 1926 reached the highest peak point since the post-war slump. There are indications also that two other mills, the Peshtigo Paper Company, Peshtigo, Wis., and the American Writing Paper Company, DePere, Wis., will be placed back on a sound basis, leaving the state with practically all of its mills operating satisfactorily and at capacity.

Wisconsin continues to be in the front rank in the production of pulp and paper, but the output of news print is not increasing. About one-third of the production is news print, and wrapping paper and wall board are increasing in volume. Daily production of the 60 mills located in 32 Wisconsin towns, is now more than 2,200 tons, with 17,000 workers employed.

New Concerns Organized

The Menasha Paper Mills Company was organized in October, 1926, with Norman Brokow as president. The corporation took over the Island Paper Company, Menasha, Wis., converted the plant for the making of straw board and has production under way.

The Nicolet Paper Company was incorporated at DePere, Wis., and is understood to be the organization which will operate the former American Writing Paper Company mill. H. C. Hancke, formerly with the Rhinelander Paper Company, is expected to be the general manager.

Appointment several weeks ago of R. P. Allen of Detroit, Mich., as receiver for the bankrupt Peshtigo Paper Company, Peshtigo, Wis., was expected to result in resumption of production at full capacity. The plant was conducted under receivership since June, 1925, by John D. Bird, Milwaukee, and operated on a partial production basis. The mill will be sold at auction in May, and a reorganization planned at that time is expected to mean the beginning of a stable career.

New concerns started include the Badger State Paper Company, Milwaukee, Wis organized by Howard R. Lees. The company is making gummed tape, bread wrappers and other specialties, and also is jobbing toilet paper, towels, etc. The American Paper Company, Milwaukee, was organized to deal in timber and will otherwise be concerned with paper manufacturing interests. At Menasha, Wis., the Imperial Paper Products Company was incorporated by George P. Pierce, H. E. Landgraf and T. E. McGillan. The concern makes and sells embossed and glassine paper and other articles.

Changes in Existing Concerns

A number of changes were made in existing concerns during the last twelve months. The Cellucotton Products Company, subsidiary of the Kimberly-Clark Company, Neenah, Wis., changed its name to the Kotex Ctmpany, due to the universal familiarity with the sanitary products it makes. The accounting offices were moved to Chicago early this year so as to effect closer co-operation with the sales offices, already located there. The Kotex Company erected two five story factory units within about a year's time to take care of the heavy demand. The line of products is being increased to include surgical and dental sanitary specialties.

Late in the summer the Appleton Coated Paper Company, Appleton, Wis., increased its capital stock from $600,000 to $1,250,000, to provide for future expansion. The Janesville Paper and Supply Company changed its name to the Dizton Wholesale Supply Company, and moved its business from Janesville, Wis., to Madison, Wis.

Reorganization also was consummated about January 1 of this year by the Moloch Foundry and Machine Company, Kaukauna, Wis. An issue of $90,000 worth of preferred stock was sold and arrangements made to operate at capacity in the future.

Elections the first of this year brought two changes in the Consolidated Water Power and Paper Company, Wisconsin Rapids, Wis. E. B. Redford and Stanton W. Mead were elected to the board of directors to succeed George P. Berkey and Isaac P. Witter, resigned. Mr. Redford is secretary and Mr. Redford treasurer. One change in the Kimberly-Clark Company, Neenah, Wis., was the addition of J. S. Sensenbrenner to the directorate as vice president in charge of sales.

Control of the Victory Bag and Paper Company, Marinette, Wis., was acquired by the Continental Bag and Paper Mill Corporation of New York, early last year by purchasing the interest of Aaron Pareira, president. Mr. Pareira resigned so he could devote all his time to his interests in the Reliance Paper Company, Marinette.

Enlargements and Improvements

In addition to the enlargements mentioned above, improvements were made in a number of plants. The Nekoosa-Edwards Paper Company of Nekoosa, Wis., completed a huge dam which resulted in the impounding of an artificial lake supplied with water from Four Mile creek. This Provides a 12-acre settling basin and affords a pure water supply.

An imposing new office building of two stories was built by the Neenah Paper Company, Neenah, Wis. At Appleton, Wis., an addition was built to the boiler house and a warehouse added. This company also installed a new 48-inch paper coating machine to take care of orders for narrower stock than the original machines turned out. The Consolidated Water Power and Paper Company constructed a new steam plant at Wisconsin Rapids, installing several large boilers to provide power for the generators and steam for the dryers.

Employees of the Kimberly-Clark Company's mill at Niagara Wis., were given a new clubhouse through the generosity of their company. The building was put up last summer and is now being enjoyed daily.

Improvements made at the Continental Paper and Bag Mills Corporation plants at Marinette, Wis., and Menominee, Mich., include a new sulphite screen room at the Park mill, new acid tanks at the Park and Menominee mills, more wood preparing machinery and new drying and ventilating equipment.

A new acid system was installed by the Wolf River Fibre and Paper Company, Shawano, Wis., with two 91-foot towers included in the construction. This company also built a new sulphur warehouse. Construction also was completed during the last year by the Fox River Paper Company, Appleton, Wis., of a three story brick building which houses a filter plant, machine shop and offices of the engineering department.

The Lake Superior Paper Company, Ashland, Wis., completed a new bleaching plant about February 1 and also installed three napkin folding machines. Need for added storage led the Bergstrom Paper Company, Neenah, Wis., to construct a large warehouse next to its mill. The building is of six stories and is 80 by 160 feet. Machinery and equipment of the newly organized Esco Paper Company, Peshtigo, Wis., were purchased by the Menasha Printing and Carton Company, Menasha, Wis., and moved to the latter plant.

one

continuously efficient screen operation

more

continuously efficient felt operation

step

continuously efficient wire operation

toward continuous production of uniform quality paper

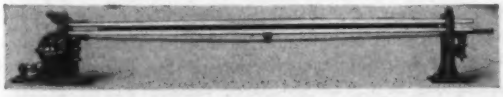
For ideal operating economy a paper machine should produce paper of uniform quality continuously at maximum speed.

One serious obstacle to both quantity and quality production used to be screens. The Bird Screen overcame it.

Another was felts, until Bird introduced the Vickery Felt Conditioner to eradicate felt troubles.

Now comes the Alexander-Youngchild Wire Cleaner to eliminate what is perhaps the chief remaining hindrance to efficient production by keeping the machine wire continuously spotless.

May we prove to you that this latest Bird development is no less profitable an investment for you than those which have preceded it?



BIRD MACHINE COMPANY
South Walpole Massachusetts

The Alexander-Youngchild
Wire Cleaner

With a new boiler room completed and boiler installed, and new beaters and stock pumps added the DePere Paper Manufacturing Company, DePere, Wis., increased production 10 per cent. The company also contemplates adding a 72-inch cylinder machine soon.

Power Expansion Activities

In power expansion activities of the last year, perhaps the biggest project is that of the Northern Electric Company, subsidiary of the Northern Paper Mills, Green Bay, Wis. This concern is now constructing two 28-foot dams on the Menominee river at White Rapids and Chalk Hills at a cost in excess of $2,000,000. They will develop about 70,000,000 kilowatt hours annually, and will supply both the Northern mills and the Milwaukee Electric Railway and Light Company with power.

Added power is available to mills at Green Bay and DePere through completion of the Bayside Steam plant, which connects with the hydro-electric lines of the Wisconsin Public Service Corporation. The Bayside provides approximately 30,000 horsepower.

Another new power source on the Fox river is the Rapid Grouche dam of the Green Bay and Mississippi Canal Company, located near Kaukauna, Wis. The dam is 587.7 feet long and is one of the finest on the river. The Chippewa river also is to have a dam costing $3,000,000 which will be built at Chippewa Falls, Wis., by the Northern States Power Company, one of the utilities controlled by H. M. Byllesby & Co.

The Wisconsin Valley Power Company, with headquarters at Wausau, Wis., was organized by paper mill interests in that vicinity to acquire the assets of the Antigo Electric Company and the Rhinelander Light and Power Company. C. C. Yawkey is president of the new company. In order to bring all its water powers under one control, the Consolidated Water Power and Paper Company reorganized the Oneida Power Company and changed the name to the Consolidated Water Power Company. The power sites it owns are valued at $2,000,000. A dam 900 feet long and 24 feet high has been erected by the Wisconsin River and Pulp Company, Stevens Point, Wis., on the Wisconsin river.

Safety Movement Grows

Safey continues to be in the forefront in Wisconsin paper mills and subsidiary interests. Schools for foremen have been organized in a number of cities, especially in the Fox River Valley, with the paper industry leading in promotion, attendance and interest. Experts are being called in from distant points to give the best possible instruction in mill safety.

Contests still hold paramount interest, the Neenah mill of the Kimberly-Clark Company, Neenah, Wis., having won first place in the National Safety Council competition this last year. The Kimberly mill of this company won a gigantic contest on Jan. 1, 1927, from the Niagara mill. The Nekoosa-Edwards Paper Company also has been active along this line, with the Nekoosa mill leading.

One entire day was devoted to a discussion of safety at the second annual Fox River Valley Safety Conference held at Appleton, Wis., in September. It was the largest gathering of its kind ever held. Group meetings were held, with paper mill executives conducting one of their own to take up problems peculiar to the mills.

Two safety records of some moment were achieved. The Kimberly mill of the Kimberly-Clark Company operated for three hundred years of "safety man days" without an accident. The Kotex Company, Neenah, Wis., subsidiary of the Kimberly-Clark Company, with 300 employees, operated for 400 days without a serious accident.

Technical Education

Technical education of paper mill employees also was given more attention during this last year than ever before. The vocational schools at Appleton, Neenah, Menasha, Kaukauna and Green Bay, Wis., conducted evening classes in paper and pulp making, with an expert in this industry as instructor. Surveys of the paper industry were made in each city first and the classes then organized. Several hundred mill employees took advantage of this training. The Kimberly-Clark Company is attempting to go further than this by building up one of the most complete paper mill libraries in existence. A vast amount of books, magazines and other literature already has been accumulated and classified. Mill employees are making a suprisingly extensive use of this material in order to better themselves as workmen.

Changes in Mill Personnel

Changes in paper mill personnel were numerous during the last year. Albert C. Gilbert was elected president of the Gilbert Paper Company, Menasha, Wis., to succeed his deceased father, W. M. Gilbert. Herbert W. Brightman, salesmanager for the Northern Paper Mills, Green Bay, resigned to take a position with the Crown Willamette Paper Company, San Francisco, Calif. L. G. Wood succeeded him.

R. C. Bay, general manager of the Lakeview Paper Company, Neenah, Wis., resigned to take up residence on a fruit ranch in Florida. Resigning as vice president and general manager of the Consolidated Water Power and Paper Company, Wisconsin Rapids, George P. Berkey became vice president of the Crown Willamette Paper Company. Frank Youngman, manager of the Consolidated Company's mill at Port Arthur, Ont., also resigned to take a west coast position. James Simpson is now manager of the Wisconsin Rapids mill of the Consolidated, and C. E. Jackson has taken up the Port Arthur manager's post in the Thunder Bay Paper Company.

The Nekoosa-Edwards Paper Company of Port Edwards, Wis., now is under the management of John E. Alexander, succeeding his father, L. M. Alexander, president of the company. R. C. Swan, manager of the Peshtigo Paper Company, Peshtigo, Wis., left that position early in the year and expects to engage elsewhere in the industry. Charles W. Martin has been made superintendent of the newly organized Menasha Paper Mills Company, Menasha, Wis.

Deatns in the Industry

Several men of prominence in the paper industry were called by death during the last year. W. M. Gilbert, pioneer in paper circles and president of the Gilbert Paper Company, died early in the year 1926, at his home at Neenah, Wis. In September death took E. T. Harman of Milwaukee, Wis. He formerly was manager of the Biron Pulp and Paper Company of Biron, Wis. In December the death of H. G. Freeman of Appleton, Wis., occurred. He formerly was treasurer and general manager of the Fox River Paper Company, Appleton, and built the industry up substantially.

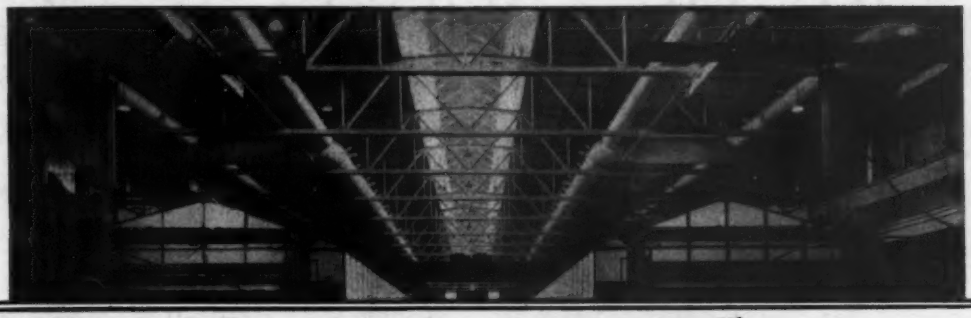
No Serious Fires

Wisconsin has been fortunate in the last year to have avoided serious fires or catastrophes of any kind. There were a few minor plant fires, but the damage was not above $5,000 in any case. Fatal accidents were at a noticeable minimum, largely due to the safety work conducted in so many places.

Guayule Plant for Paper

At the request of a rubber concern which is utilizing the Mexican guayule plant for production of rubber, some laboratory tests were made by the Paper Section of the Bureau of Standards, Washington, D. C., of the paper making quality of the fibrous residue remaining after the extraction of the rubber constituents.

Officials in charge of the tests say that the fiber was found to be weak and short, the yield of fiber was rather low and the fairly large residue of rubber constituents was rather low and the material would give considerable difficulty in paper making processes. It could possibly be used for boards if moulded into shape but it has a very low value even for this purpose, it is said.



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The A B C of Paper Mill Safety Organization

G. W. Phillips, Champion Fibre Co., Canton, N. C.

When we speak of the A B C of Paper Mill Safety Organization, we mean of course, the fundamentals of organization or the best way to begin. Although I may not be able to tell you the best way, I shall endeavor to give you a few suggestions which seem to me are very important in organizing for accident prevention, and should be given consideration.

No Set Rule Can Be Laid Down

You understand, of course, that conditions vary somewhat in different plants, therefore, no set rule can be laid down or followed.

It is generally conceded, I believe, that the accident problem involves three essential activities: Safeguarding, education, and engineering adjustments. To secure the best results, it is necessary, of course, that the highest measure of cooperation exist between the management and the worker.

The management must be thoroughly "sold" on the value of safety work in the plant. In other words, safety must have an equal place along with production, financing, etc. Don't make it a kind of "side issue," a welfare proposition. Every employee must understand that it is a business proposition; that safety is as much a part of their job as any other duties. If the management is not in earnest, the workers will not be.

In organizing for safety, it is absolutely necessary that one man should direct all of the safety activities. The departmental superintendent and foreman are interested primarily in production. Therefore, if the safety of the plant is left entirely to them it is apt to be neglected in the interest of producion.

We have long since learned that to accomplish the best results in any enterprise, especially in accident prevention, a certain amount of organization is necessary. Now, I do not mean, of course, that there should be a lot of unnecessary "red tape stuff," but with the right kind of organization I am sure that a better spirit of cooperation can be developed.

Should Be Two Committees

There should be at least two committees, an executive and a shop committee. The executive committee should be composed of the manager and superintendents from each department of the plant, together with the safety director. This committee should meet once a week to discuss and act upon all safety problems over which the shop safety committee does not have jurisdiction, and consider safety suggestions and recommendations for the prevention of injuries. In other words, this committee should act as a clearing house for all safety ideas and activities and follow them until disposed of.

This committee should also decide all questions of operating methods which affect the safety of the workers; decide on standards for guarding machinery and equipment, standard operating policies, safety rules, and so on.

The safety engineer should submit to this committee a report of each injury causing lost time, together with a suggestion for the prevention of a recurrence of a similar accident.

Shop Committee

A shop committee should be composed of either foreman or workmen from the various departments of the plant. This committee should consist of at least five members and should meet each week. The duties of the shop safety committee should be:

1. To make inspections of the plant for unsafe conditions and practices, and submit a report to the safety engineer.
2. Help create a safety "atmosphere" in the plant.
3. Instruct the workmen in safe methods of doing their work and discourage unsafe practices.
4. To investigate all serious accidents and near accidents and make a report with recommendations.
5. Help to encourage the cooperative spirit between the management and the workers.

Size of the Committee

The size of this committee will depend upon the size of the plant, but should, of course, consist of enough members to insure a variety of ideas and opinions; however, not so many that all members will not have a chance to express themselves in the short space of time allotted for the meeting, which should not be more than one hour each week.

As to the election or selection of this committee there is a wide difference of opinion. Personally, I favor appointment by the superintendents of the various departments. When the committee members are chosen by the elective method, there is danger of the wrong men being chosen. Members who are not enthusiastic for safety, or who do not harmonize in a safety committee, will be a hindrance rather than a help. All members of this committee should be selected with a view of rendering the best service. It is a good idea to change the members at regular intervals.

Experience has shown that the most productive field now open to development is that of education—that is creating and maintaining interest in safety.

Concrete Program Essential

To accomplish worthwhile results in safety education, I believe that a definite, concrete program is absolutely essential. I do not mean merely posting bulletins, placing danger signs or formulating a lot of safety rules, all of which are of course more or less necessary; but there should be a program of instruction covering the hazards of each particular job, followed by a convincing argument why employees should make safety their first consideration.

All dangerous places and equipment should be guarded and made reasonably safe, but we should always bear in mind that "a careful employee is the best safeguard."

An Educational Value

I am convinced that in the plant where men are taught to play safe, there will be less accidents without mechanical safeguards, than there will be in the plant where all machines and dangerous places are well guarded and the employees disregard safe practices.

Remember, careful workmen are not born, they must be taugth to observe the rule of saefty. The most effective method perhaps is "precept upon precept, line upon line, here a little there a little," or in other words a constant and everlasting repetition of the message of caution. It may require the patience of Job, the wisdom of Solomon and the persistence of a book agent, but remember that life and time are at stake and we should put forth every effort possible to prevent injuries.

Supervision an Important Part

Department superintendents must be convinced that supervision plays an important part in the elimination of accidents, that they are responsible to a large extent for accidents in their departments, just as they are held accountable for production, and that the safety of their men is a real part of their operating problems. The foreman and workman must also be "sold" on safety. All of which can better be accomplished through the medium of an organization.

* Presented at the annual meeting of the Pulp and Paper Section of the National Safety Council.

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CONSTRUCTION NEWS

A Summary of Vital Facts Regarding Construction, Finances and Operation of Paper Mills

Construction News

San Francisco, Cal.—The Crown Willamette Paper Company, 248 Battery street, San Francisco, has engaged B. C. Condit, 365 Bellevue street, Oakland, Cal., engineer, to prepare plans for its proposed new mill at Campbell River, B. C., following recent approval of the Provincial Government of the project. The initial plant will be equipped for a production of 200 tons of news print per day. The development will include the construction of a hydroelectric generating plant at Campbell River Falls. The complete project is estimated to cost in excess of $10,000,000.

Eau Clair, Wis.—The Dells Paper and Pulp Company, Eau Clair, is considering plans for extensions and improvements in the steam-operated electric generating plant at its local mill, to include the installation of additional equipment. Douglas & Kryster, 425 East Water street, Milwaukee, Wis., engineers, have been engaged to make a survey of present conditions and give recommendations.

Oakfield, N. Y.—United States Gypsum Company has completed plans for the construction of a paper mill at its local plant, to be equipped for the manufacture of fiber binders for bundled rock lath. The plant will use waste paper as a source of raw material, and will be scheduled for large output. It is estimated to cost more than $75,000, with equipment. Headquarters of the company are at 205 West Monroe street, Chicago, Ill.

Kimberly, Wis.—The Kimberly-Clark Paper Company, Neenah, Wis., plans the rebuilding of the portion of its local mill, destroyed by fire February 21, with loss reported at close to $30,000, including equipment. It is understood that the fire was caused by an explosion of sulphur dust.

Dunkirk, N. Y.—The Warder Paper Box Company, West Third street, has revised plans nearing completion for the construction of a new two-story and basement plant, 62 x 120 feet, on Courtney street, near Buckner street, estimated to cost about $50,000, with equipment. Chester R. Phelps, Gluck Building, Niagara Falls, N. Y., is architect. J. H. Warder is president.

Seattle, Wash.—Henry L. Gray, Henry Building, Seattle, is at the head of a project to construct and operate a new pulp and paper mill on the Tideflats, where site has been selected near the plant of the Shaffer Box Company. Application has been made to the City Council for permission to proceed with the project. The plant will consist of a group of one-story units, estimated to cost about $350,000. It is understood that a company will be organized to carry out the enterprise.

Longview, Wash.—The Longview Fibre Company has begun work on the initial units of its proposed local pulp and paper mill, comprising a continuous one, two, three and four-story structure, brick and reinforced-concrete. It will be equipped for an initial output of about 100 tons per day. The entire project will cost more than $1,000,000. R. A. Wertheimer, Kaukauna, Wis., is consulting engineer.

Chicago, Ill.—The Shellmar Products Company, Milwaukee, Wis., manufacturer of paper labels, etc., has leased property at 1503 West Sixty-fifth street, in the Clearing Industrial District, totaling about 17,000 sq. ft. of floor space, and will operate a new plant at this location. It is proposed to begin work immediately.

St. Joseph, Mo.—The Western Tablet and Stationery Corporation, recently organized under Delaware laws, to take over and operate a number of going companies for the manufacture of writing papers, tablets, package paper and kindred products, has arranged for a bond issue of $2,000,000, a portion of the proceeds to be used for carrying out the consolidation and for proposed extensions and improvements in present mills for increased output. The merger includes the American Tablet and Stationery Company, Green Bay, Wis.; The Tablet Company, West Carrollton, Ohio.; the Kalamazoo Stationery Company, Kalamazoo, Mich.; the Hooper Paper Company, Richmond, Va.; the Smith Tablet Company, Holyoke, Mass., and the Northwest Tablet Company, Minneapolis, Minn. W. W. Sunderland is president.

Lafayette, Ind.—The Haywood Tag Company has asked bids on general contract for the construction of its proposed new plant at Main and Seventh streets, to be one-story and basement, 45 x 120 feet, brick, steel and concrete, estimated to cost close to $40,000, with equipment. It will be used largely for storage and distributing service. Walter Scholer, Painters & Decorators Building, is architect.

Kansas City, Mo.—The Diamond State Fibre Company, Kemper Building, Kansas City, is said to have preliminary plans under way for the construction of a new one-story plant on local site, reported to cost more than $25,000, with equipment.

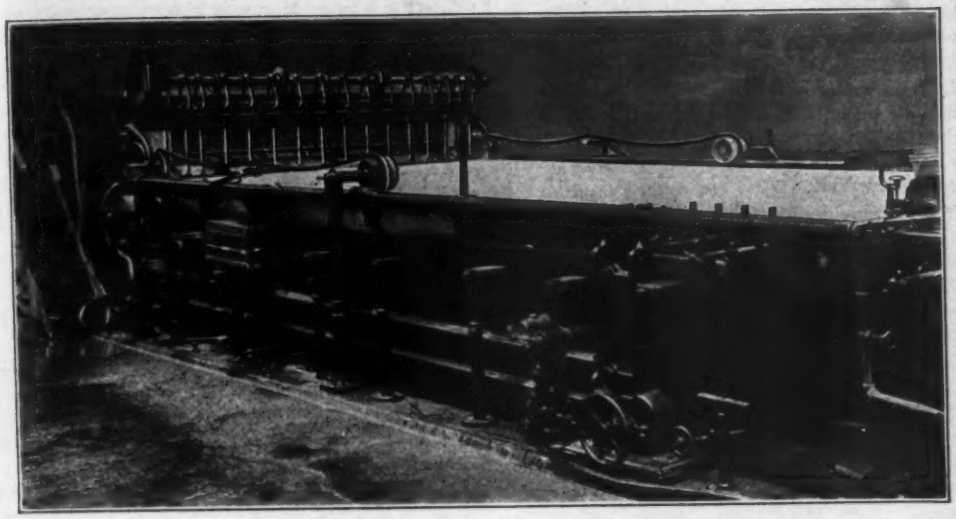
New Westminster, B. C.—The Canadian Rayon Pulp Company, Ltd., recently organized by officials of the Westminster Paper Company, has preliminary plans under way for the construction of a new pulp mill on Poplar Island, B. C., to develop raw material for rayon production. It is reported to cost more than $200,000, with equipment. J. Herb, president of the Westminster Company, will also act in the same capacity for the new organization.

Smooth Rock Falls, Ont.—The Abitibi Company, Ltd., recent purchaser of the Mattagami Pulp & Paper Company, Ltd., with local pulp mill of 60,000 tons annual capacity, has arranged for a bond issue of $4,000,000, a portion of the proceeds to provide for the acquisition of the company noted, and for proposed expansion. The Abitibi Company contemplates the development of the property as a news print mill in the future to include both pulp and finished paper production. Alexander Smith is president.

Victoria, B. C.—The Sidney Roofing and Paper Company has authorized plans for the construction of a new pulp mill in the Industrial Reservation, for which permission has recently been secured, and proposes to begin operations at an early date. The plant is estimated to cost about $100,000, with equipment. K. B. Spurgin is engineer, in charge.

New Companies, Etc.

Boston, Mass.—The Stone & Andrew Company has been incorporated with capital of 6,000 shares of stock, no par value, to manufacture and deal in paper products. Wendell H. Marden is



Speeding Up Production and Maintaining Quality

The general tendency of speeding up production frequently requires the sacrificing of a certain quality in paper when the old slice method is used. The slice method is at best only a makeshift in preserving quality at higher speeds. Below is an excerpt of a letter from a manufacturer who experienced this difficulty:

"Like all mills we are after more production and at the same time we want to keep up our quality. As we speed up we find that we have trouble in forming the sheet and we wonder if you could overcome the difficulty with the Voith Inlet."

The answer to this is—The Voith Inlet will allow for comparatively faster machine speeds without sacrificing quality, when ample drying capacity is available. The stock is correctly fed onto the wire and more wire surface is used for formation purposes. We will be glad to give you full information about this machine.

VALLEY IRON WORKS CO.

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New York Office: 350 Madison Avenue

190 Voith Inlets in Use

president; and Thomas J. K. Parker, 64 Pearl street, Boston, treasurer and representative.

Chicago, Ill.—The Davenport-Taylor Label Company, 412 Orlean street, has been incorporated with capital of $40,000, to manufacture paper and other specialties. The incorporators are Arthur C. Davenport, George Fraser and Edwin T. Taylor.

New York, N. Y.—The M. Jaffee Paper Box Company, has been incorporated with capital of $30,000, to manufacture paper boxes and containers. The incorporators are M. Jaffee and M. and L. Lavender. The company is represented by Lewis Nadel, 285 Madison avenue, New York.

Jamaica, N. Y.—Metropolitan Mounting & Finishing Company, Jamaica, has been incorporated with capital of $50,000, to manufacture and deal in cardboard stocks, paper, etc. Incorporators: A. J. Sibbel, A. D. Hult and C. Bashwiner. The company is represented by R. H. Kruppenbacher, Ridgewood, N. J.

New York, N. Y.—The Century and State Paper Box Company has been incorporated with capital of $20,000, to manufacture paper boxes and containers. The incorporators are B. I. Cohen and H. Engel. The company is represented by R. P. Russakow, 291 Broadway, New York.

St. Louis, Mo.—The E. S. Hager Paper Box Company has been incorporated with capital of $15,000, to manufacture paper boxes and containers. E. S. Hager, 1244 Temple Place, is the principal incorporator.

Jersey City, N. J.—The Ogden Paper Company, 263 Ogden avenue, has filed notice of organization to deal in paper goods. Benjamin Jarkowsky, 308 Madison avenue, New York, heads the company.

New York, N. Y.—The Chick Paper Box Company has been incorporated with capital of $12,000, to manufacture paper boxes and containers. The incorporators are A. Weisinger and S. Wach. The company is represented by Nathan Bardach, 5 Beekman street, New York.

Columbus, Ohio—The Columbus Paper Box Company has been incorporated with capital of $10,000, to manufacture paper boxes, etc. The incorporators are B. M. and O. Wilbur Lippincott, and I. B. Jackson, all of Columbus.

Reforestation Plan For Ontario

A reforestation plan of a far-seeing nature has been outlined by Hon. William Finlayson, Minister of Lands and Forests for the province of Ontario. In the Legislature recently, on the occasion of the one hundredth anniversary of the first authorized timber sale in the province, Mr. Finlayson stated that the people must realize that they have to face the reforestation policy and must make the necessary provision from year to year to rehabilitate the timber industry of Ontario.

A Forestry Bill, which is the policy of the Ministry in legislative terms, seeks to divide Ontario into three sections for the purpose of reforestation. In Southern Ontario a determined effort is to be made to interest farmers in planting out their waste land. All manner of departmental aid and instruction will be forthcoming and as a special inducement to subscribe to the scheme, the Government assures the farmer who agrees to bear the expense of placing 10 per cent. of his acreage under reforestation, that he will be exempted of taxation on the acreage involved. It is also proposed to depopulate the Laurentian shield (Central Ontario), which is particularly adapted to reforestation, and to transfer the settlers, all expenses paid, to the clay belt farther north and there provide them with land holdings equal to those abandoned. Up where extensive "stands" of valuable timber are still to be had, the Government's policy will be one "giving nature a chance," with the ever-watchful eye of the forest air patrols ready at all times to aid in the furtherance of that policy.

"Our timber wealth must remain," said Finlayson, in deploring the fact that in the infant stages of the industry there had been no efforts at conservation. "Timber must be treated as a crop and not as a mine."

Governments had erred in the past, he said. Lumbermen themselves had erred. Money in good timber that had gone up in smoke in Ontario sawmills, he contended, would have gone a long way toward paying off the province's debt. Old methods of logging had been designed apparently for no other reason than to invite fire and disaster.

"One of the fixed policies of this Government," said he, in referring to the rapid growth of the pulp and paper industry in Ontario, "is to stop the export of pulp as soon as possible." The first pulpwood sale had been made in 1891. Today Ontario was producing 2,600 tons of news print daily and in the next three or four years would raise that figure to a daily output of 4,500. He was glad to note that poplar, which long held second place in this industry by virtue of the fact that spruce is extensively used for news print, was now coming into its own in the field of finer paper.

In this connection Mr. Finlayson flashed a warning. The Government, he said, was hesitating now to make further commitments as to the expansion of the news print industry in Ontario. The possibility of the market being unable to absorb production had, he inferred, influenced this hesitation.

Leading up to the valuation of Ontario's forest industries, Mr. Finlayson ridiculed the belief that white and red pine were things of the past. Ontario still possessed, he contended, the finest stands of white pine in the world, and even at the present terrific rate of consumption, they would last for fifty years, quite unaugmented by the reforestation work of the present day.

Ontario's timber production for the last five years he valued at approximately $120,000,000. In view of the fact that the Government spends nearly a million dollars yearly in its fire protection for the industry, Mr. Finlayson thought that the lumbermen—particularly those who bought their tracts under the old system that gave them Crown as well as cutting rights to the limits—should pay a more adequate fire tax than they do at the present time. Out of this fire protection tax the Government last year drew a revenue of $306,119.51.

Superior Wire Co. Takes Over MacKay Works

[FROM OUR REGULAR CORRESPONDENT]

KALAMAZOO, Mich., February 26, 1927.—The Superior Wire Company has taken over the business of the MacKay Wire Works and is now getting regularly under operation. When it was found necessary to wind up the affairs of the MacKay concern, Frederick J. Buckley, associated with W. S. Dewing, Wilfred Strong, W. A. Maxwell and Malcolm J. MacKay, acquired the assets, determined to continue. He placed William A. Biddlecome in charge of the plant.

"We will not only continue the manufacture of fourdrinier wires" said Mr. Buckley, "but will also make cylinder mould covers and wires for screen plates and coating mill screens. We are now making cylinder mould covers of bronze wires, as bronze combats the effects of acids better than brass. We have three looms set up and ready for operation and can make fourdrinier wires as wide as 166 inches."

Kimberly-Clark Safety Control

The Kimberly-Clark Company writes:—"An article appearing in the February 3 issue of the PAPER TRADE JOURNAL, stating that the Kimberly Mill of the Kimberly-Clark Company won the safety contest with the Niagara Mill, is erroneous. The contest was declared a draw and the safety supremacy between the two mills was to be decided by another contest. Niagara immediately challenged Kimberly to another contest but Kimberly declined to accept.

"In view of the fact that the Niagara Mill has never lost an inter-mill contest with Kimberly, it appears that Kimberly will have to look to Niagara for leadership in safety."

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DEPENDABLE service as well as dependable dyestuffs, is necessary for the successful coloring of paper stock.

Our Technical Laboratory is fully equipped with all modern apparatus including small beaters, paper machines, fadeometers and ultra-violet lamps for testing light-fastness, paper testers, apparatus for fiber analysis and equipment for coating, calender coloring and dipping work. The staff includes men of long experience in both laboratory and mill who can intelligently recommend formulae and work out special problems.

Experienced demonstrators are available at our branch offices who will be glad to make recommendations, and assist in practical mill runs.

Address your inquiries to our main office or to any of our branch offices, and be assured of dependable service, as well as dependable dyestuffs.

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8 Thomas St.

Providence, R. I.
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San Francisco, Cal.
569 Mission St.

Obituary

J. F. McCall

[FROM OUR REGULAR CORRESPONDENT]

DAYTON, Ohio, March 1, 1927.—J. F. McCall, night superintendent of the Maxwell Paper Company, at Franklin, died in that town last week, following a brief illness from pneumonia. Mr. McCall arrived in Franklin from Niagara Falls, N. Y., only a few days before his demise. He had just begun the organization of the night shift when he was stricken. The malady progressed so rapidly that his life was despaired of by attending physicians and his family notified. Members of the family arrived on the morning of his death. The body was taken to his old home for burial. The Maxwell plant is running night and day and it was hoped with the arrival of Superintendent McCall that the organization of the force would be complete.

Arthur H. Scott

PHILADELPHIA, Pa., February 26, 1927.—Arthur H. Scott, fifty-two, president of the Scott Paper Company of Chester, Pa., and one of the most widely known paper manufacturers of the country, died here to-day following a stroke of apoplexy. He was a great lover of flowers and had a fine collection of irises and peonies on his place in Rose Valley near here. He was one of the founders of the American Peony Society and at the time of his death was treasurer of the American Iris Society.

News of the Northwestern Paper Industry

The Longview Fibre Company of Longview, Wash., has let the contracts for steel boilers and other tank equipment for the cooking and washing processes to King Brothers Boiler Works of Portland, delivery on this equipment to begin in two months. The total weight of this will be 900 tons. Steel boiler heads 12 feet in diameter were delivered this week by water from the Atlantic Coast, and are at the King Boiler plant. W. E. Dodge, construction engineer at the site of the new $2,500,000 project of this company, and V. L. Melosh, construction foreman, are continually on the job now. Two buildings are completed and the office building is 90% complete, the windows being in and heating plant in operation. Foundation for the main building has been started.

C. L. Shorno, vice-president of the Blake, Moffitt & Towne Paper Company, Portland, Ore., has been in the hospital for an operation, but is recovering and will be allowed to return home in a few days.

The Western Paper Converting Company, Salem, Ore., has increased its capital stock from $100,000 to $200,000.

The state corporation commissioner of Oregon has granted the permit asked by the Northwest Pulp and Paper Company of Astoria, to sell preferred stock to the amount of $1,000,000. The money is to be used for development purposes. A. V. Allen of Astoria is president of this company and S. A. Billie is secretary.

Boston Paper Market Conditions

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., February 28, 1927.—Boston paper dealers report general stability in their lines with little fluctuation. One of the features of present day developments in the paper market is the effort on the part of the mills to standardize their production and give the printer everything they can for the price. As the result, the lines of paper made are of a better quality than they used to be. Then, too, they are being offered at a lower figure than ever before in the past. More paper is being used by the printer. There are longer machine runs so that the machine cost is less. This condition puts before the printer a vast variety from which to adjust colors, weights, sizes and finishes to the printer's own customers, showing a broader choice of high grade papers. The printer has given to the paper manufacturers, says one of them, a broader idea of craftsmanship. The order to the paper man comes from the printer. The buyer of printing used to demand fine brochures on bond papers, but the bond paper doesn't carry the atmosphere that is found in fine antiques or in book papers. One paper man, particularly, has watched this development for the last few years and the present year shows this well advanced.

Generally speaking, there has been something of a lull in the paper industry in the last two months, but the trade has put forward some new lines of direct-by-mail-advertising that calls for much paper, so that the tone of printing is improving for that reason. The direct-by-mail advertising is no longer unknown to the customer. Papers with colorful lines are coming out. In discussing this phase of the business, a Boston paper man states that he believes that New England is coming forward with a great deal of fine advertising preparation. He also notes, however, that the year preceding the presidential election is not a favorable one for business. Every industry, accordingly, is making all efforts for greater business. The paper industry, including both merchants and mills, is certainly doing its part.

The Arnold-Roberts Company has announced reductions in prices on some of the Westvaco lines, made by the West Virginia Pulp and Paper Company.

Chromium Plated Evaporator Tubes

As is well known, considerable corrosion is experienced with evaporator tubes even where the alkaline black liquors of soda and sulphate mills are concentrated for recovery of the soda.

An interesting application of Dr. C. G. Fink's process for electroplating metals with an alloy of 95 per cent chromium which was included as one of the outstanding achievements in American Chemistry of recent years in the National Chemical Exposition, is the treatment of black liquor evaporator tubes.

Chemical Treatment Co. New York, which handles the process advises that several soda and sulphate pulp mills have tested these plated tubes and have found them of great advantage in resisting the corrosion which previously had been extremely troublesome and expensive.

Estate of Thomas F. Garvan

[FROM OUR REGULAR CORRESPONDENT]

HARTFORD, Conn., March 1, 1927.—The inventory of the estate of the late Thomas F. Garvan of this city former president of P. Garvan Company, Inc., rag and paper stock dealers, shows an estate of $1,166,934 of which a large part is set aside for charitable bequests. The sum of $600,000 is set aside for beds in the St. Francis hospital; and after life use by his widow the sum of $200,000 will be turned over to St. Agnes home. Mr. Garvan retired from the presidency of the company about five years ago and has been succeeded by his brother John X. Garvan.

Dr. Little Honored

Dr. Arthur D. Little, President of Arthur D. Little, Inc., Cambridge, Mass., was elected Vice Chairman of the Engineering Foundation at its annual meeting in New York, February 17. The Engineering Foundation is the Joint Research Instrumentality of the American Civil, Mining and Metallurgical Mechanical and Electrical Societies and the United Engineering Society.

New Bates Valve Bag Factory at Menominee

In announcing the prospective opening of the new factory of the Bates Valve Bag Company, the location was given as Marinette. The correct location is of course, Menominee, Mich., where the plant and factory of the Hoskin-Morainville Paper Company also are located.

New York Trade Jottings

All the paper jobbers in the city are being invited to attend an important meeting of the Paper and Twine Board of Trade at the Hotel Pennsylvania, on Wednesday, March 9, at 8 p. m.

* * *

The regular weekly luncheon meeting of the New York Division of the Salesmen's Association of the Paper Industry was held last Monday at the Canadian Club, New York, a satisfactory number of members attending.

* * *

The Independent Paper Mills, patentees and manufacturers of HY-G paper napkins and paper towels, with executive offices at 1182 Broadway, New York, announce that Paul H. Horwitt, formerly president of the Independent Paper Mills, of Plattsburg, N. Y., has severed his connections with this concern.

* * *

During Convention Week, Daniel M. Hicks, Inc., specialists in paper mill supplies, of 200 Fifth avenue, New York, entertained a number of their friends in the industry to a banquet and vaudeville program at the Hotel Pennsylvania, on Wednesday evening. The event was most successful, and all present spent a most enjoyable time.

* * *

The Aldine Paper Mills, Inc., announce that their offices and warehouses are now established in new quarters at 333 Hudson street, New York. In this excellent location, and with their enlarged facilities, they will be enabled to render their clients a paper service more complete than at any time before. The new telephone number of the Aldine Paper Mills is Walker 3646.

* * *

Charles E. O'Hara, president of the Seymour Paper Company, announces that Leonard O. White, formerly with the White-Burbank Paper Company, is now associated with the Seymour Company, of 323-329 West 16th street, New York. Lester Grady and George Bascom have resigned from their respective positions as vice president and secretary, and have severed their connections with the Seymour Company.

Waste Material Dealers to Convene

The Fourteenth Annual Meeting of the National Association of Waste Material Dealers at which will be elected a president for a term of one year, fifteen directors to serve for two years and one director to fill a vacancy, will be held at the Hotel Astor, New York, on Wednesday, March 16, at 10:30 a. m. The annual meeting, together with the various division meetings and the fourteenth annual banquet, is expected to bring together the largest gathering of waste material dealers that has ever attended the association meetings: this notwithstanding the quiet condition of the waste material industry at the present time.

Indications are that every section of the country will be well represented and the dealer who misses the opportunity thus afforded to meet his fellow members as well as to broaden out his business connections, can hardly be alive to the possibilities open to him. Since the association discontinued holding quarterly meetings the annual meeting in the spring affords about the only real opportunity for members of the industry to get together in any large number and it is fully anticipated that members throughout the country will take advantage of the opportunity offered to be in New York on March 15 and 16th.

An important meting of the Foreign Trade Division will be held at the Hotel Astor, on Tuesday, March 15, at 12:30 p. m., with J. W. Long, chairman, presiding. The Foreign Trade Division embraces in its membership all members interested in foreign business and as both import and export business in waste materials is constantly increasing in volume,, it is important that members interested in foreign business should make a special effort to attend the meeting of the Foreign Trade Division where a number of difficult problems will be under consideration.

A meeting of the Paper Stock Division will be held at the Hotel Astor, Tuesday, March 15, at 12:00 o'clock noon, with G. H. Rady, chairman, presiding. Aside from the election of a chairman to serve during the year ending March 24, 1928, there are some very important matters to come before the meeting, and a large attendance of members is expected.

A meeting of the Waste Paper Division has been called by the chairman, Robert F. Graham, for Tuesday, March 15, at 11:00 a.m. at the Hotel Astor. At this meeting a chairman for the ensuing year must be elected and other matters of interest to waste paper dealers will be considered. Members handling waste paper are urged to be present.

On account of the large number of members who are planning to come to New York on March 15 and 16 to attend the annual convention of the National Association of Waste Material Dealers, the association will maintain at the Hotel Astor a Registration Bureau, where all members may register. This will enable friends of members to know at what hotel they are stopping and will also indicate the time of their arrival in the city. Members should bear in mind that there are many banquets being held in New York during the month of March and should, therefore, see to it that their necessary hotel reservations are made sufficiently early to insure their being taken care of.

Bids for Government Paper

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., March 1, 1927.—The Government Printing Office has received the following bids for 10,000 pounds of No. 1, 26x38—No. 12 binders board: Barton, Duer & Koch Company, $127.00 per ton; Mathers-Lamm Paper Company, $78.48; and The Davey Company, $85.00.

The Government Printing Office has received the following bids for 324 pounds of 24x36—216, brown cloth lined paper: Dobler & Mudge, $162.00; Mathers-Lamm Paper Company, $237.03; R. P. Andrews Paper Company, $248.50; and Barton, Duer & Koch, $168.00.

The Printing Office will receive bids on March 2 for 2,550 pounds (50,000 sheets) of 17x28—51, green safety writing paper.

Crescent Paper Co. Has Exhibit

INDIANAPOLIS, Ind., March 1, 1927.—The graphic arts leaders of America, fifty pieces of master printing chosen in national competition, were on display recently in the showrooms of the Crescent Paper Company of Indianapolis, and attracted wide attention. All admirers of fine printing were invited to view the exhibit free of charge. More than 15,000 pieces of their best work were submitted in the national contest which decided the best. The fifty winners were selected by a board of nationally recognized master printers. The prize winners displayed are considered the finest examples of printing craftsmanship produced during 1926.

Max Katz Bag Co. To Build New Warehouse

INDIANAPOLIS, Ind., March 1, 1927.—Construction of a new one-story building on Virginia avenue in Indianapolis and extending back 140 feet, will begin immediately according to officials of the Max Katz Bag Company, 315 South New Jersey street, owners. Erection of the building, which will be of tile and brick construction, will begin as soon as wrecking of an old building on the property has been completed.

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CONCERN ABOUT NEWS PRINT

The fact that the market for news print during January failed to absorb the average production of mills proportionate to capacity is held in Canada, according to reports to mean that over-production of news print is no longer a possibility of the future but an actual fact. Financial houses for some time past have been warning the public against speculation in news print shares, with the consequence that prices have fallen off materially, and that there is now little trading in this group of stocks on the Montreal and Toronto exchanges. There are rumors of conferences among leaders in the industry in Montreal to consider the whole question of production and marketing arrangements, but whether, in view of the many smaller companies that have come, or are coming, into production, price competition can be regulated remains to be seen.

Doubt has already been expressed as to whether some companies are getting more than $62.50 per ton. An indication of the trend of events it is said, is to be seen in the announcement that the Brompton Pulp and Paper Company has withdrawn from the Canadian Export Paper Company, and will set up its own selling agency. This is taken to mean that in view of the company's increased tonnage, it is not satisfied with the proportion of shipments allotted to its mills. In making the announcement of the withdrawal of the Brompton Company, George Chahoon, Jr., the president of the Export Company, stated that customers heretofore supplied in the United States from the Brompton mills would now receive their news print from the mills of Price Bros. & Co., and the Laurentide Company, which now manufacture between them over 1,100 tons of news print per day, and enjoy the unique advantage of being independent of any surrounding groups or combinations of manufactures. These companies, therefore, would benefit by a substantial increase in their contract tonnage.

In general it is held that, taking the long view, the stronger companies have nothing to fear, because they will easily be able to tide over what it is thought may only be a temporary congestion of the market, but the newer companies, in view of their capital commitments, may not be able to face the future with the same complacency, and, by trying to force a place in the markets, may inaugurate a period of price-cutting.

However, the capacity of the producing mills is at present but very little in excess of the absorbing power of the market. If the spring brings another general expansion of business in the United States it is felt in Canada the market may easily catch up to the capacity of the mills, while events in the Orient may at any time result in a large increase in the use of news print.

Another factor is that as the International Paper company's brings up the tonnage of its Canadian mills, it will turn over some of its United States mills to the production of fine paper, and that therefore the actual increase in capacity of the news print mills will not be as great as the figures would seem to indicate.

A NATIONAL OPPORTUNITY

As long as conservation is a dominant factor in the perpetuation of the country's forests, the people of the United States must accept forestry as an opportunity as well as a responsibility, E. A. Sherman, associate forester of the Forest Service, United States Department of Agriculture, told the American Forestry Association at the annual meeting in New Haven recently.

The fact that the dark side of forestry has been overdrawn, Mr. Sherman asserts, is largely the result of the magnitude of the task involved in the conservation and restoration of our forests. The evidence of the economic disaster confronting our Nation has made forestry somewhat of a bugbear, he said, nothwithstanding the fact that the intelligent people of the United States now thoroughly understand and deplore the fact that 81 million acres of forest land are idle, and that the United States is consuming each year four times as much timber as it grows.

"For long years past," said Mr. Sherman, "we have bewailed our wasted forests, our idle acres, our silent mills and abandoned towns, the rapid diminution of our remaining forest resources, the blindness and stupidity of our national carelessness with fire. We have preached the curse of wasted resources, blackened stumps, barren lands, and economic damnation generally; but I want to urge that henceforth we preach the blessing of new and better forests, industries restored upon a permanent basis, and the landscape beautiful arising from the ashes of the landscape desolated."

Mr. Sherman emphasized that the fight for conservation has in no wise ended, he said: "It seems to me that the jobs ahead of foresters today are just as important and as compelling from a national standpoint as ever before in the history of forestry. It may be that the written law of conservation is more firmly fixed in our statute books to-day than ever before, but to keep it there requires unceasing vigilance."

Viewing the forestry situation to-day, Mr. Sherman said the people of the Nation must realize expenditures for forest protection and production, increase our national wealth and tend to reduce the national burden upon industry, and that such expenditures are an exceedingly safe and profitable investment.

"We must sell to our people the idea that beauty as well as the utility of our forests has a real value measurable in dollars and cents in that it makes the country more attractive for the habitation of man and adds materially to the sale value of every acre of land within the radius of its influence," he continued.

The value of replanting trees on denuded forest lands was also brought out by the speaker, who declared that 3,000 acres are being restored by artificial means in Michigan each year.

"A planting program of 10,000 acres a year would in 50 years make this idle land the most valuable solid body of rural land of comparable size anywhere in Michigan," he asserted. "The net return each year to the Government from such an investment would amount to approximately $1,500,000 while at the same time contributing to the State treasury each year over a half million dollars in lieu of taxation.

"Instead of bewailing the fact that it costs money to protect forests and plant new trees, and that all this expense might have been avoided," he said in conclusion, "why not emphasize the fact that by expenditure of only a relatively small amount of money we can have cheaper and better homes, finer streams, better fishing and hunting, a more attractive landscape; and that by so providing forehandedly for the future we have demonstrated that as a nation we are selfsupporting and permanent, and do not owe our commercial supremacy simply to the fortunate circumstance of rich resources accidentally inherited."

Z. W. Ranck Again Heads Tissue Association

DAYTON, Ohio, March 1, 1927.—Members of the paper trade in the Miami Valley were interested the past week in the re-election of Z. W. Ranck of Middletown, as the president of the National Association of Tissue Paper Manufacturers in New York.

A telegram was received by Mr. Ranck's associates informing them of his re-election. In view of the service rendered by Mr. Ranck they were not greatly surprised he had been retained as the head of this important organization.

Mr. Ranck is president of the Crystal Tissue Company and through his efforts during the past few years, the use of tissues has been extended until now the product of such mills has become practical and covers a wide diversity of uses which in years agone were not even considered to be possible.

Mr. Ranck's friends marvel at his ability to dispose of work for besides his tissue mills at Amanda, near Middletown, he is interested in a bank and other enterprises and he finds time to act as president of the Middletown Civic Association, which handles all of the civic and trade bodies of the Paper City. Each year, a budget is fixed for the maintenance of the various branches and the advancement and welfare of the city has depended in large measure upon the success of the various activities. Mr. Ranck not only acts as president but serves. He does not delegate duties to others when by giving personal attention, details may be worked out more quickly and effectively.

The number of improvements introduced and the new buildings erected and machines installed at Amanda show to what extent he is interested in the making of tissue paper. Elaborate plans are in the making for future improvements, according to present reports.

Ready To Start On Northwest Paper Co.

The Gilpin Construction Company of Portland, Ore., will start work on the proposed plant for the Northwestern Pulp and Paper Company as soon as the city of Astoria fulfills its agreement relative to the construction of the additional water system. The plans and survey for the Young's river water system have been submitted to the city commission by the consulting engineer, and the commission in addition to accepting the plans has instructed the city engineer and city attorney to take immediate steps for securing the right of way for the pipe line that would serve the paper plant district. The plans for the water system contemplate the construction of an arch dam a short distance above Young's river falls with a pipe line about eight miles long to the city. As previously announced, this plant will produce 50 tons of pulp per day.

Canadian Paper Exports Grow

A report issued by the Canadian Pulp and Paper Association shows that exports of pulp and paper from Canada during January were valued at $13,449,017 as compared with a total value of $13,191,885 for January, 1926.

Wood pulp exports for the month were valued at $3,665,055 and exports of paper at $9,783,962 as against $4,246,730 and $8,945,155 respectively in January, 1926.

Details for the various grades are as follows:

	January, 1927 Tons	$	January, 1926 Tons	$
PULP:				
Mechanical	12,575	349,055	x32,996	977,229
Sulphate	11,570	708,095	12,658	796,386
Sulphite Bleached	21,624	1,653,912	15,189	1,239,509
Sulphite Unbleached	17,111	953,993	22,501	1,233,606
	62,880	3,665,055	83,344	4,246,730
PAPER:				
New Print	142,329	9,294,674	125,999	8,372,141
Wrapping	1,539	178,116	1,358	179,999
Book (cwts.)	2,461	22,604	840	9,133
Writing (cwts.)	1,135	9,470	84	603
All Other	.....	279,098	.....	383,279
		9,783,962		8,945,155

For the twelve months ending January 31, 1927, the total value of the exports of pulp and paper was $173,748,767 which was a notable increase over the value for the twelve months ending January 31, 1926, for which period the total value was $156,477,943.

The greatest gain in the twelve months' period was in the exports of paper which were valued at $122,253,320 as compared with $107,653,597 in the previous twelve months, while pulp exports increased in value from $48,824,346 to $51,495,447.

Details for the twelve months' period ending January 31 are as follows:

	12 mos. to Jan. 31, 1927 Tons	$	12 mos. to Jan. 31, 1926 Tons	$
PULP:				
Mechanical	361,651	10,877,644	372,767	10,939,461
Sulphate	167,046	10,355,247	152,198	9,338,784
Sulphite, Bleached	207,429	16,148,623	186,574	14,218,265
Sulphite Unbleached	249,684	14,113,933	268,396	14,327,836
	985,810	51,495,447	979,935	48,824,346
PAPER:				
News Print	1,748,315	115,013,128	1,423,000	99,954,059
Wrapping	18,699	2,257,780	20,380	2,731,188
Book (cwts.)	62,166	533,808	46,910	428,569
Writing (cwts.)	20,095	152,673	11,927	96,857
All Other	.....	4,295,931	.....	4,442,924
		122,253,320		107,653,597

To Be Superintendent of Riverside Division

HOLYOKE, Mass., March 1, 1927.—John R. Lyman for the past three years connected with the manufacturing department of the American Writing Paper Company under General Superintendent William L. Nixon has been appointed as superintendent of the Riverside Division of the Company assuming his new duties today. His position as Assistant Superintendent has been filled by the appointment of George F. Carroll.

The appointment of these two men is in harmony with the announced policy of President Sidney L. Willson to give men in the ranks the opportunity of attaining greater heights in the industry if they have the necessary qualifications. Mr. Lyman who has been in the paper manufacturing business several years is the son of E. L. Lyman of the Phoenix Realty Associates.

Mr. Carroll has been for several years boss machine tender at the Riverside and the promotion is following out the established policy. He has worked at practically all the departments of the business.

Swedish Paper Prices Show Decrease

WASHINGTON, D. C., March 1, 1927.—The average prices of paper in the Swedish Domestic market, as reported by the Paper Association of Sweden, showed a decrease in all lines except newsprint in rolls, according to American Consul McVitty, at Stockholdm. Wood pulp prices, however, have remained unchanged.

MATHIESON
Industrial Chemicals

The Importance of Quality Insurance

In most cases, the margin of difference between the price of a quality product and an inferior one is so small that it is unimportant. But in those instances where the difference is great, unwary buyers are apt to overlook the sinister meaning of such a differential.

Those buyers who have seen new brands appear suddenly on the horizon, and just as suddenly sink into oblivion, have learned that it is scarcely safe to experiment with the unknown. Rather than attempt to beat the market—rather than gamble with an untried product—they specify Mathieson EAGLE-THISTLE Chemicals, and thus insure the quality and uniformity of the materials required.

These purchasers are also awake to the fact that by buying direct from Mathieson, they are afforded the advantages of a highly developed customer-service—a service that embraces such all-important branches as traffic counsel, technical advice and warehousing facilities of the highest type.

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Deal Direct with the Manufacturer

Section of the
Technical Association of the Pulp and Paper Industry

AN ORGANIZATION FOR THE ENCOURAGEMENT OF ORIGINAL INVESTIGATION AND RESEARCH WORK IN MILL ENGINEERING AND THE CHEMISTRY OF PAPER, CELLULOSE AND PAPER-MAKING FIBERS GENERALLY; IT AIMS TO PROVIDE MEANS FOR THE INTERCHANGE OF IDEAS AMONG ITS MEMBERS IN ORDER THAT PROCESSES OF MANUFACTURE MAY BE MADE MORE EFFICIENT AND IMPROVED ALONG TECHNICAL LINES.

Conducted by W.G. MacNAUGHTON, Secretary

The Stain For Microscopic Determination Of Fibers

By Dr. Th. Bentzen[1]

At the present time I am working on the very interesting problem of a simplified method of photomicrographic reproduction of stained paper pulp slides in natural colors. The first important condition I had to have at my disposal was a stain that would give powerful and contrasting images of the different colors, characterizing the different kinds of fibers. At the same time such an ideal stain should be reliable, under equal conditions, always giving the same intense result. However, none of the well known staining methods I have used hitherto were able to comply with these requisites. As I take it for granted that every TAPPI member has *Paper Testing Methods*, 1924 (revision of 1922), it will be unnecessary to go into details about the composition of the different stains, and I shall therefore proceed without further introduction.

The Standard Stains

In the early days I used the well known Herzberg stain which contains zinc chloride besides iodine, but the results too often turned out to be a disappointment as the characteristic color contrast of the rag and wood pulp did not appear. Then I tried Jenk's stain where the zinc chloride is replaced by magnesium chloride and the results obtained with this combination were somewhat better. After coming to the United States I became acquainted with Sutermeister's stain where two solutions, of which first the iodine solution and then a calcium chloride solution, are applied to the fibers. This stain I have used for five years with altogether good results until the photomicrographic problem required still more strongly marked qualities with respect to maintaining uniformity of the results with powerful contrasts.

The Herzberg Stain

In his book *Papierprüfung* Herzberg emphasizes that care should be taken in the exact quantity of the different component parts of his mixture, "as even slight deviations will influence the effect." It is a well known fact, however, that such compounds as zinc chloride, magnesium chloride and calcium chloride, are extremely hygroscopic, which makes it practically impossible to weigh the prescribed amount with chemical exactness. Of course, this undesirable quality will also more or less affect the strength of practically saturated solutions if these are prepared under differing temperature conditions.

Now we know where the troubles are developed and at the same time we understand how to avoid them for it is evident that if only we could prepare a solution containing a certain exact amount of the chlorine compound according to its molecular weight, and then combine this with the proper amount of iodine, we would then have produced the stain which answers its end.

Some time ago my attention was directed to the article on this matter by Muriel F. Merritt in PAPER TRADE JOURNAL, August 24, 1922, and then I found what I wanted, and as Mrs. Merritt's method is perfectly satisfactory in every way I shall tell how I am using it.

Improved Standard Herzberg Stain

Stain A

Zinc chloride solution of 1.8 specific gravity which is obtained by dissolving 100 grams of zinc chloride (in fused sticks) in about 50 cc. of distilled water.

Solution B

Distilled water (pipette)	12.5 cc.
Potassium iodide	5.25 gr.
Iodine	0.25 gr.

After dissolving,

1. Place 40 cc. of solution A into a 1 inch graduated 100 cc. cylinder.
2. Add solution B.
3. Keep in a dark place for 24 hours.
4. Pipette all clear solution into a dark bottle and add a little iodine.

Keep the stain in a dark bottle in a dark place. Prepare and mix fresh solutions once (or eventually twice) every month. The equipment for preparing this stain may be secured direct from the Arthur H. Thomas Company, Philadelphia, or through any other laboratory supply company.

Although it may be regarded as a matter of no importance, it is nevertheless found that the brilliant color contrast fades after a short time. I shall try to find a way to overcome this undesirable quality but I hardly believe that I shall succeed. Any proposal will be received with gratitude.

To make this discussion a little more complete I shall briefly explain my method for preparing the pulp and making the slides:

1. Small pieces of the four different corners of the sample of the paper to be determined are torn into small pieces,
2. Placed in a test tube about 8 x 1 inches,

[1] Member TAPPI; Chief Chemist, Whiting-Plover Paper Co., Stevens Point, Wis.

3. About 10 to 20 cc. of a 0.5 per cent solution of sodium hydroxide added.
4. The test tube is placed in an electric test tube boiler (Chicago Surgical & Electrical Company) which is adjusted to the suitable temperature.
5. Heat to boiling and keep boiling for 3 minutes, controlled by a 3 minute sandglass.
6. Remove test tube from boiler and add cold water. Wait until paper goes to the bottom; then remove the liquid with help of a 50 cc. pipette equipped with a rubber bulb of about 50 cc. capacity.
7. In this way wash the paper about five or 6 times and be sure to have the pipette and bulb perfectly cleaned before they are used for another test.
8. Leave about 20 cc. of water in the test tube, close the opening with the thumb, and shake it vigorously until the paper is entirely beaten to pulp.
9. If the paper resists this kind of beating I transfer it together with the water into a pyrex glass tube (wall of about 1½ mm. thickness) without lip (as used for ignition purposes), about 8 x 1 inches, and beat it with the help of some small marble chips.
10. With the help of a spear pointed dissecting needle, I transfer a sufficiently large clot of the pulp upon a piece of hardened filter paper which will take up the water leaving the pulp only moist.
11. A sufficiently large drop of the Graff stain is applied on a clean, dry slide and the pulp added, whereupon with the help of a dissecting needle it is soaked and spread out to make a homogeneous image, without any clogs or knots, that is not too dense. The use of a dissecting block with glass stage, the mirror replaced by a piece of milk glass or white cardboard, and the magnifier removed, is much to be recommended for preparing the slides.
12. With the help of forceps, a clear and dry cover glass is placed on the prepared pulp. A slight pressure with the finger will bring the superfluous stain out from under the cover glass, whereupon it can be easily removed with the help of a piece of moist filter paper.

Fiber Determination

Now the slide is ready for examination under the microscope but to discuss whether our determination ought to be based upon a simple estimation or upon one or the other of the different methods based upon counting or calculation of the fibers, would take us too far. I, for my part, believe in the plain estimation method, usually preparing three slides to get an average and using a binocular microscope with a mechanical stage.

It sometimes happens that the three slides or even different parts of the same slide give very different indications of the fiber contents. So far as I have been able to prove this depends upon the circumstance that broken paper has been added to the beater and as such material would offer more resistance to the beating in the test tube than fresh pulp the mixture, instead of being homogeneous, will consist of slugs of very differing composition. In such a case a few cubic centimeters of the prepared pulp are transferred to another empty test tube and water added until about three-quarters full. The contents are now shaken until the single fibers swim apart in the water. Leave the test tube a short time so that the fibers may settle, then remove the supernatant water and transfer the precipitated pulp to a watch glass to be used for making the slides. When very exact determinations are required this method is always to be preferred.

Lindenmeyr Opens Uptown Office

A branch office under the management of Messrs. Joseph B. Seaman and Edward P. Patterson, both formerly conected with the Seaman Patrick Company, has been opened by Henry Lindenmeyr & Sons at 220 Fifth Avenue, New York.

Glue as Beater Sizing

During the World War the shortage of rosin and of the better grades of paper-making materials in Europe led to the development of processes involving the use of glue in the beating engine stage of paper manufacture. It has been claimed that through such uses of glue, paper could be rendered water resistant or sized, as is ordinarily done with rosin, and that papers made from cheaper raw materials, including rather large proportions of mineral filler, would be materially improved in strength and other desirable qualities. The processes referred to generally involve the use of aluminum compounds to jell the glue solution before its use.

Certain paper manufacturers in this country ordinarily use glue in conjunction with rosin sizing to impart special characteristics to their products. This use of glue has not become more common because under some conditions glue causes excessive foaming in the beating engine. When this occurs a large proportion of the glue remains in solution and is lost in the waste water from the papermaking machine.

Studied by Bureau of Standards

The possibility of improving certain desirable qualities of papers and in this way extending the use of cheaper papermaking materials such as reclaimed papers and mineral fillers, has led to a study of the use of glue in the beating engine by the Bureau of Standards, Department of Commerce in cooperation with the Glue Research Corporation. This study included consideration of several glue-jelling agents, comparisons of jelled glue and glue solutions, the use of different kinds of pulps and of several grades of glue as well as several modifications of the paper-beating procedure.

H-ion Value Must Be Controlled

It has been found that the jelling of the glue before adding it to the beater offers no advantages over the use of glue solutions, but that if good retention of the glue in the finished paper is to be obtained, the hydrogen-ion concentration or active acidity of the beater contents must be carefully controlled. By regulating the addition of alum to the beater so that the water from the paper machine has an acidity of about 4.5 (pH), the foaming during the beating and subsequent operations is reduced to a minimum. Also, at this acidity, the retention of glue in the finished paper is generally at its maximum. The retentions of glue compare favorably with those of clay filler under similar conditions. Optimum operating conditions are obtained by furnishing the papermaking materials to the beater in the following order: pulp, filler (if used), rosin size, alum, glue, the glue being added about one hour before the beating is completed.

Found To Be Undersized

Experimental papers containing glue without rosin size, when dried on the cylinders of the papermaking machine, were found to be unsized (water-leaf). Similar papers, when air dried at room temperatures, were found to be only slightly sized and unfitted for writing purposes. These papers varied but little in strength from similar waterleaf papers made without glue although the glue-containing papers did seem harder and firmer than the others.

Paper Quality Improves

In papers containing both glue and rosin, the strength is frequently and the degree of sizing is generally improved as compared with similar papers when sized with rosin alone. The chief influence of the glue on various types of paper seems to be to improve such intangible properties as firmness, hardness, rattle, and handling qualities. In these respects, experimental sulphite writing papers containing glue seem to approach rag-content bond qualities rather than those of commercial sulphite papers. The improvements in strength, degree of sizing and the intangible qualities just noted are especially marked in book papers containing clay filler.

Alkalis as Bases for Sulphite Liquor

By Dr. J. Hausen, Berlin-Friedenau

More than ever before certain attempts in the pulp chemistry of recent years may be noted which are aimed at cooking hitherto more or less unpulpable cellulosic raw material, by means of some modification of the sulphite process. These endeavors which, especially in America, have become of considerable interest, concern themselves, for the most part with the substitution of alkali, totally or in part, for lime and magnesia, the sulphite liquor bases used at present. Thus Johnsen[1] reports concerning attempts to use sodium sulphite in place of calcium bisulphate, which readily led to promising results as regards yield and bleachability of the product. He reasons that in this way the utilization of certain woods which could not be cooked successfully with calcium bisulphite would become possible. The Sulphite Pulp Committee of Technical Association of the Pulp and Paper Industry mentions in its report for 1926[2] the use on a technical scale of sodium and ammonium as bases for sulphite liquor for the cooking of hard and resinous woods. The results obtained should entitle us to some hope, but a definite judgment concerning the new methods is not permissible.

The idea of using soda or other alkalis, ammonia included, as bases for sulphite liquor is as old as the sulphite process itself. It met with refutation throughout a large number of patent writings and publications concerning which the following is written.

The attempt to classify according to certain features the extraordinary varied proposals which, with the exception of several of more recent date, were permitted to survive only in the annals of patent offices, yielded, essentially, three groups of methods which may be more or less sharply differentiated. The first group A includes all those methods in which a distinctly acid condition is maintained and in which alkalis or ammonia are utilized as the double sulphurous acid salts or with a surplus of sulphurous acid. The second group B embraces those methods in which the cooking agent is neutral alkali or ammonium sulphite with either insufficient sulphurous acid to convert it completely into bisulphite or with a surplus of alkali. Such methods, then, propose modification of the normal sulphite method, particularly those with higher base content or variations of the alkaline cooking methods. In between these two groups are those which use neutral sulphite without admixture. Finally, as a third group C, there must be mentioned those that employ a highly acid liquor and which have for bases, the adjacent alkaline earths, and also alkalis in more or less amounts.

A. Acid Cooking Methods with Alkalis as Bases

The oldest sulphite method with alkali as the base is laid down in an American patent of the year 1851 concerning which Schindler,[3] 1884, tells us. The patentee soaks straw in soda liquor and treats the penetrated material, after draining, with sulphurous acid, in the form of gas from sulphur burners. He maintains that a surplus of SO_2 accelerates the cooking and converts the incrusting substances, as well as coloring matter, into a form which can be washed out with water. The same idea was taken up later by Archbold and protected for him by a United States patent.[4] He employed, in contradistinction to his predecessor, a higher pressure during the SO_2 treatment.

It appears doubtful that these two-phase methods ever reached industrial application since the interest of pulp chemists of that time turned to the single phase cooking process developed by Tilghman and his followers. Tilghman protected with his patents[5] the cooking of cellulose bearing materials with sulphurous acid and with the admixture of sulphites. He held the addition of the sulphurous acid salts of lime, magnesia, or sodium to be very desirable, because the free fibers could be bleached much brighter and more easily than by the use of sulphurous acid alone.

Kellner, to whom the Tilghman patents were unknown, discovered sulphite digestion by a cook with sodium bisulphite liquor.[6] He was occupied with the problem of regenerating the black liquor from alkali cooking by passing in sulphurous acid followed by causticizing with lime. Through an oversight on the part of his laboratory assistant, Anton Haller, one batch was cooked with the uncausticized, i.e., bisulphite liquor instead of the regenerated. From this it was found that in this manner a good, well bleached, and above all, stronger pulp could be attained by means of alkaline cooking. Since it was known that acids contracted cell membranes the discovery did not astound them.

Then when Kellner as well as Tilghman subsequently replaced the sodium with lime and magnesia salts, this was done solely because of their comparative cheapness. Whatever differences in cooking results that could be ascribed to the nature of the substituted bases appear to have been seen neither by these experimenters nor by Mitscherlich. The first who asserted such distinctions was Ekman. Ekman recognized[7] that magnesia and sodium, contrary to lime, possessed certain favorable properties that would make it appear that their substitution for lime was desirable. Among these favorable properties he mentions the greater solubility of the sulphites and sulphates of these bases. Because of this, impurities of the pulp due to insoluble sulphites and sulphates, as with lime, are not present. He also ascribes to magnesia a greater penetrative power upon the incrusting substances and asserts that pulps so produced are softer and whiter than those obtained with calcium bisulphite. Sodium, according to him, has even to higher degree, the same properties that make magnesia appear more desirable than lime, but yet it was too expensive to be of use industrially,—a reason which caused Ekman to concentrate upon the use of magnesia bisulphite liquors. The pulps thus produced, marketed by him in the middle '70's are said to have surpassed those of Mitscherlich in cleanliness and whiteness.

Ammonia as the Base Studied

The favorable action of alkalis in the cooking process on one hand, and the difficulties of their recovery from their liquors on the other, induced the scrutiny of ammonia, the alkali which because of its volatility, could most readily be recovered from its liquors. Of the many sulphite processes with ammonia as the base, only one belongs to the group here considered, and at that, only partly. Masurawa in several patents[8] protected the cooking of wood, bamboo, or other fibrous materials with solutions of ammonium bisulphite or ammonium sulphate and sulphurous acid. As an exceptional disadvantage of the lime bisulphite process he points out the fact that with higher temperature there occurs a precipitation of calcium sulphite and gypsum on the surface of the chips, which hinders uniform penetration and produces uneven cooks. In general, as the cooking liquor was

[1] Papier Fabrikant, November 7, 14, and 21, 1926. Translated by Arthur Pollak, Junior Member TAPPI.
[2] Jour. Ind. and Eng. Chem., 1923, p. 891. Paper Trade J. 77, No. 11, p. 47 (Sept. 13, 1923).
[3] Tech. Assoc. Papers 9, 1926, p. 51.
[4] Papier Zeitung, 1884, p. 1927.
[5] George Archbold, U. S. pat. No. 274,250 (Mar. 20, 1883). See Griffin & Little, Chem. of Paper (1894), p. 471.
[6] B. C. Tilghman, U. S. pats. No. 70,485, Nov. 5, 1867; 92,229, July 6, 1869; Br. pat. No. 2,924.
[7] Kellner. Papier Zeitung, 1885, p. 233.
[8] Hoffmann. Handbuch der Papierfabr., 1897, p. 1511.
[9] Jap. pat. No. 31,914. U. S. pat. No. 1,244,525, 1897. (See also Tech. Assoc. Papers IX (1926), p. 138, where patent numbers are given as T. Maruzawa, Jap. pat. No. 31,941, Dec. 24, 1917. U. S. pat. No. 1,244,525. C. A. 12, p. 2249. (1918. Ed. note.)

decomposed, the hydrogen-ion concentration rose, whereupon the fibers become brittle and the yield decreases. To avoid these evils one is compelled to cook at a comparatively low temperature, but for a decidedly longer time. Higher temperatures and shorter cooking periods may be obtained, however, by the use of ammonium bisulphite which is stable and offers no disadvantages even at high temperatures. Cooks can thus be finished in a short time and a better product obtained than with calcium bisulphite liquor. By certain changes in the procedure pulps may be obtained with definitely desired qualities, as for instance, kraft pulps. The active agent of the cooking liquor is the HSO_3-ion and the H-ion. The concentration of the latter does not exceed a certain limit during the entire cooking process owing to the buffer action of the salts present. Because of this the tenderness of the fibers, or the feel of the pulp is improved.

The strength of the liquor to be used depends upon the non-cellulose content of the raw material, and the composition of the liquor upon the quantities desired in the pulp produced. Thus, for example, to get a light colored pulp ammonium bisulphite alone is used while to produce an easy bleaching pulp, an admixture of SO_2 is requisite, and in fact, in such a concentration that to every 1.5 to 3 moles of the salt, there is 1 mole of SO_2 over this amount is disadvantageous. For the production of kraft pulp, neutral sulphite is added to the bisulphite in the relation of 1 mole: 0.2 to 0.3 mole neutral salt. In this case one has what is decidedly a sulphite process with a higher base content, something often mentioned in patent literature. The hydrogen ion concentration in these three cases is fundamentally different. At room temperature it amounts, in the first case to 1/1000 mole per liter; in the second, 2/100 mole per liter; and in the third, about 1/100,000 mole per liter. The temperature requirements and times of cooking are also varied. In all cases there is a two hour cooking at 110 degrees centigrade in order to facilitate complete penetration of material. The length of the final cooking depends upon the temperature and in the first case amounts to, two hours at 160 degrees centigrade; in the second case, to ½ to 1 hour at the same temperature. In the third case the cooking is done at a temperature of 180 degrees centigrade and takes somewhat longer than in the first two cases. In the first case a pulp with over 90 percent pure cellulose is obtained, in the second one, with 97 per cent pure cellulose. In the third case a bleached, very strong pulp, containing about 15 percent non-cellulose matter, of the nature of kraft pulp is obtained with a yield of 60 per cent.

Advantages of Ammonia Discussed

Concerning how and in what circumstances this method entered into practice, there is nothing known. On the economic side, the question of ammonia recovery is, of course, of paramount importance. Although this recovery appears to be essentially simpler than for the fixed alkalis, yet one must not forget the fact that the distillation of the liquor with lime necessitates a considerable expenditure of heat, for the liquor must be concentrated to at least one third of its original volume in order to recover a sufficient quantity of ammonia. Concerning the technical side of the actual cooking method, it cannot be denied that there is much in favor of the possibility of controlling the cooking liquor and producing a desirable pulp because of the high solubility of the sulphite. Certain cooking liquor combinations, as for instance, those with high base content, cannot be attained at all when lime is used as the base. Whether, on the other hand, the buffer section of ammonia salts surpasses that of calcium salts, remains uncertain. Conductivity measurements of this sulphite liquor establish, however, that the hydrogen ion concentration does not change appreciably during a cook.

Furthermore, it must not be overlooked that a specific action, which has a beneficial effect on the lignocellulose complex must be ascribed to the ammonia. This is known from the research of Cross and Engelstad[9] who investigated the effect upon the results of the cook of the addition of various bases to sulphurous acid. These experiments showed a series of interesting results which are briefly gone into here. These investigators had shown in a previous work[10] that cooking with sulphrous acid solution, (6 to 8 per cent) the limit of the delignification was a condition in which there were free fibers, but that these held lignin. These fibers required a large amount of chlorine to bleach, but this difficulty could be obviated by the addition of bases, since these bases react with the aldehydic or ketonic carbonyl groups of the lignocellulose. They then undertook a series of cooks to establish the relative effect of the various bases. The results arrived at by the use of liquors whose total sulphurous acid content was within that of industrial practice (5 per cent) are especially interesting. The addition of base was at all times adjusted so that only about one-fifth of the total SO_2 existed in the combined or semicombined form. The nature of this process was then really a mean between the technical sulphite process and a pure sulphurous acid process. The effect of the addition of bases was distinctly noticeable, and there were certain gradations according to the nature of the base added which may be summed up in the following sentences.

Experimental Results

Upon the addition of equivalent amounts of ammonia, sodium, lime, or magnesia, maintaining all other conditions constant, the favorable effect of the bases upon cooking occurred in the following order. The yield with magnesia was lowest being 30 percent (on the original weight of wood). With lime it was 35 percent, with ammonium and sodium it reached nearly 50 percent. The degree of cooking, obtained by determining the amount uncooked gave relative results. After 24 hours cooking at 110 degrees centegrade, with a solution of 5 percent SO_2, with the addition of 2.5 grams ammonia per liter and respectively equivalent amounts of soda, lime, and magnesia, the uncooked portions were—

With ammonia	1.3 per cent
With soda	5.2 per cent
With lime	9.6 per cent
With magnesia	21.6 per cent

All based on original weight of wood.

In these experimental results there appears for the first time, in my opinion, an exact experimental account. It shows that ammonia has, by far, the strongest action and that lime as a base acts more desirably than magnesia. Added in small amounts to sulphurous acid, magnesia does not, by far, show the advantageous properties, which according to the opinions of Ekman already mentioned, it possesses when added in normal amounts. The reason for this may well be taken to be that with such a large excess of SO_2 (as above), the difference between the solubilities of the neutral sulphites causes no appreciable effect upon the pulp, as is the case with normal liquors. Much more apparent is the specific action of the salts on the lignin complex. This action is strongest with ammonia. The authors assume that they are dealing, in part, with a catalytic effect, but there is also an addition of ammonia to the carbonyl group. Aniline and phenylhydrazine, on the other hand, which react with these groups with elimination of water, inhibit the cooking completely.

Ammonium Sulphite Process

Cross protected the above described process in a United States patent[11] in which the following cooking conditions are given. As liquor, a sulphurous acid solution of 6 to 7 percent SO_2 is used with the addition of 0.25 per cent ammonia (based on

[9] C. F. Cross and A. Engelstadt. The action of aqueous sulphurous acid on lignocellulose. II. Jour. Soc. Chem. Ind., 44, p. 270 T. (June 5, 1925). Paper Trade J. 81, no. 7, p. 45 (Aug. 20, 1925).

[10] C. F. Cross and A. Engelstadt. The action of aqueous sulphurous acid on lignocellulose. I. Jour. Soc. Chem. Ind., 43, p. 253 T (Aug. 21, 1924).

[11] U. S. pat. No. 1,547,907 (1925).

weight of the liquid). Six parts of liquor are taken for one part of wood. In four hours heated to 100 degrees centegrade and kept for two hours at this temperature. In another hour 110 degrees centigrade is reached and this temperature is maintained for fifteen to eighteen hours. In this way a readily bleachable pulp should be obtained from spruce with a yield of 51 to 53 per cent.

Concerning experiences with the technical manipulation of the method, one manager writes,[12] "It became quite clear that sulphonation is much more penetrative with this method than with the usual sulphite process. Using the same temperature and total concentration of SO_2 the dissolving power of the liquor is much more thorough and the disintegration of the raw material to pulp is much more thorough, as is evidenced by a minimum amount of screenings. Moreover, the wash waters from the pulp are much more free from fibers, from which we conclude that the fibers have retained their original length being unattacked. The fibers stick together somewhat in the shape of the original chips, but break up upon washing, to an exceptionally bright pulp. Bleaching shows a favorable behavior on the pulp, only one must be careful to prevent overbleaching (conversion to oxycellulose).

The authors are to report in a later publication upon the properties of pulp obtained with this process.

Concerning the practical value of this process nothing further has become known. In any case, the yield is not appreciably higher than that with the usual sulphite process. Whether or not the better quality of the pulp produced warranted the higher consumption of base, the recovery of which, in view of the small quantities added, surely could not pay, cannot at present be decided because of insufficient data from practical mill results.

It must be mentioned here, however, that according to a statement by Schwarz[13] during the war several pulp mills which, lacking sulphur, were unable to install pyrites burners in time, cooked with sodium bisulphite for a time. This was received from chemical plants as a 25 per cent solution or as the solid product However, in the opinion of the author, the comparatively high price of the sulphite in contrast to Sicilian sulphur and pyrites eliminates the consideration of such practice in normal circumstances.

According to accounts from Blasweiler[14], during the war in the utilization of war wastes, straw was cooked to kraft straw pulp by means of sodium bisulphite as devised in experiments by Dr. Kühle in Pfungstadt (Hesse). The results were not satisfactory so that this process found no industrial application at that time. However, at present several mills are cooking straw with sodium bisulphite.

For the sake of completeness another process by Schulte[15] for the production of half stuff must be mentioned. Here wood is soaked with sodium sulphite and sulphurous acid and then cooked with steam. The resulting pulp was to serve as a substitute for groundwood.

This exhausts the important published accounts concerning the sulphite or SO_2 process with alkalis or ammonia as bases.

B. Methods with Weakly Acid, Alkaline, or Neutral Alkali Sulphite

Into this group fall those methods which occupy a position between the distinct sulphite process and the alkaline methods, be they liquors with higher base content, or neutral or alkaline liquors.

The alkalies have the advantage over lime and magnesium of having easily soluble sulphites. By their use, therefore, one can prepare cooking liquors with insufficient sulphurous acid to completely form the bisulphite; or in other words, the base content can be raised.

The oldest method of this kind is mentioned as Graham's.[16] In this method the cooking is done with neutral sulphite until gases contained in the raw material are displaced, and then gaseous SO_2, or its water solution, is introduced in such amount that there is not enough to form the bisulphite completely. In this way the fibers are supposed to be protected from harmful effects which might otherwise result by precooking when volatile matter or gas forming substances are present in the wood.

From other considerations Schwalbe[17] arrives at a similar conclusion. He refers to the work of Tiemann[18] according to whom the addition of neutral sulphite to doubly bonded organic matter sets free alkali which must be recombined to enable the further addition of the neutral sulphite to organic matter. This Schwalbe sought to do by means of semicombined SO_2, added in amounts as to correspond in its stoichiometric value to the alkali that is set free. By means of this method, because of the absence of strong acids or alkalis, one should obtain high yields of white and unattacked pulps. As practical examples there are mentioned the cooking of wood or straw with a 5 per cent solution, made up of two parts sodium sulphite and one part sodium bisulphite, at 5 to 7 atmospheres pressure; and also, the soaking with 10 per cent neutral sulphite solution and subsequent steaming in a CO_2 atmosphere under six atmospheres pressure.

There is nothing mentioned as to whether or in which circumstances during the cooking the continually generated organic acids are able to disturb the neutrality of the liquor.

Scholz, Posanner, and von Halle,[19] propose the use of a sulphite liquor with a base content of three to four times higher than that in the usual liquor for the cooking of ripe fibrous materials as hemp, jute, bagasse, tobacco stalks, etc. The cooking with the above mentioned liquor follows an alkaline cooking. It is mentioned that the production of pulp from the above mentioned fibrous materials by the use of the usual sulphite liquor is not possible.

For the cooking of red beechwood, which may be distinguished from the other varieties of wood because of its difficultly soluble incrusted matter and its high content of coloring matter, C. A. Braun[20] proposes the use of calcium, magnesium, or alkali bisulphite liquors with 40 to 60 per cent combined SO_2. By the observance of certain precautions light colored and readily bleachable pulp is obtained.

Cooking with Neutral Alkali Sulphite

Between the alkaline and acid cooking processes there is the cooking with neutral sulphite. Because of the limited solubility of the calcium, and to a certain extent the magnesium sulphites this can only be done with alkalis as bases. The cooking liquor is weakly alkaline, nearly neutral; but contrary to the alkaline sulphite process, HSO_3 ions are formed which accelerate the cooking. It is not to be doubted that cooking with neutral sulphite does not proceed nearly as rapidly as with ordinary sulphite liquor, and for this reason more stringent cooking conditions are necessary. Moreover, the desired neutrality of the liquor does not persist throughout the cook and in consequence the liquor develops an acid reaction. For this reason in many methods the alkali sulphite liquor is made alkaline in the beginning. The discussion of these alkaline methods will be appended to the consideration of neutral alkali sulphite cooking.

The cooking process with neutral alkali sulphite was first described by Cross[21] about 1880. He found that the hydrolytic action of neutral salts was weaker than that of bisulphite and that because of this, successful cooking required temperatures of 160 to 180 de-

[12] Jour. Soc. Chem. Ind. 44, p. 270 T (June 5, 1925). Paper Trade J. 81, No. 7, p. 47 (Aug. 20, 1925).
[13] Die technische Herstellung u. Zellstoff. Halle a.d.S. 1922.
[14] Der Papierfabr., 1923, pp. 375-6.
[15] Vgl. Schwalbe, D. R. P. 282,050.
[16] Brit. pat. No. 5,365 (1882).
[17] Brit. pat. No. 19,142. D. R. P. 231,078.
[18] Ber. 31, p. 3304 (1898).
[19] D. R. P. 325,918.
[20] D. R. P. 283,290.
[21] Cross and Bevan: Cellulose. Lond., 1910, pp. 209, 210.

grees centigrade. He believed that the sulphite is consumed by addition to the lignocellulose complex since the base from acid groups becomes bound to the most strongly acid of the aldehydic or ketonic groups.

It may be assumed that Cross' modification of the sulphite process was largely due to the difficulties of properly lining digesters in the acid process. No technical application of this process, worthy of mention, so far as is known, was made at the time.

A neutral sulphite method with ammonia as the base was patented by C. A. Braun.[23] According to this method a solution of 1 to 3 per cent SO_2 is completely neutralized with ammonia. The cooking is done in indirectly heated digesters for 10 to 24 hours at 4 to 10 atmospheres pressure and is supposed to yield a very light colored, easy bleaching pulp. Even highly colored fibrous matter like jute is, after cooking, light colored and readily bleachable, giving a strong fiber very suitable for the manufacture of paper. According to statements by Dieckmann[24] there is a good yield. This really promising process has, so far as known, not been applied on a large scale as yet.

Sammet and Merrill Process

A modification of this method is the process by C. F. Sammet and J. Merrill[25] according to which fibrous materials are treated with gaseous ammonia and gaseous sulphurous acid and heating by direct steam. As a decided advantage of this process there is pointed out the small volume of liquor that occurs, a fact which decreases the steam consumption for heating and facilitates the recovery of chemicals from the spent liquor. The gases are let into the digester together with steam either continuously or intermittently. The cooking is carried out at 125 to 160 degrees centigrade, and at a pressure of 25 to 125 pounds per square inch (about 2 to 8 atmospheres) until the charge readily defibers upon mild mechanical treatment. The resulting condensate liquor can be drawn off continuously.

Drewsen's Monosulphite Process

Cooking methods using neutral sulphites received special prominence because of proposals to cook the special fibrous materials as straw, sugar cane stalks, etc. The corresponding patents were taken out by Dr. Viggo Drewsen, who uses monosulphite, neutral as well as alkaline. In reality alkali sulphites come into the question which has the almost obvious advantage of considerably higher concentration than is possible with lime or magnesia. Drewsen[26] uses 25 per cent sodium sulphite, based on the weight of dry straw. The fiber bundles become sufficiently disintegrated after four to six hours cooking at 70 pounds per square inch (5 atmospheres). There is obtained, in a yield of 40 to 45 per cent, based on weight of dry straw, a uniform pulp of gray white color, with a soft feel, but without, however—as is the case with other cooking processes for straw—sliminess, or brittleness, or parchment-like characteristics. Even the knots of the straw are so completely disintegrated that they practically disappear after the cooking, washing, and defibering. The medullary rays are so softened that they cannot be distinguished with the naked eye. This product can be used for various purposes (newsprint paper) without bleaching. When bleached the product yields very white pulp suitable for high grade papers. The cooking liquor remains alkaline to litmus throughout the cook, It has a considerably lighter color than the liquor from alkaline cooking. By acidifying with acetic acid a tannin-like material is obtained which may be used as a tanning agent. Sodium sulphite appears to act as a reducing agent since appreciable amounts of sodium sulphate may be obtained from the evaporated waste liquor.

In a more recent patent[27] Drewsen adds to the treatment of substances with neutral sulphite a second acid treatment. He recommends this method for wheat and rice straw, and others such as barley, oat, and flax straw. The first treatment is analogous to the method described. The material is cooked with monosulphite for four to eight hours (for this treatment magnesium monosulphite may also be used). The material so treated is suspended in water and run countercurrent against gas containing SO_2 until the liquor reacts acid. Thereby various organic substances are supposed to be removed. The fibers become very white and need only a few per cent of chloride of lime to bleach. For the recovery of waste liquor Drewsen proposes to evaporate, ash, leach, and treat the leachings with CO_2 whereupon sodium is obtained as the bicarbonate which, when added to sodium bisulphite, is converted into the neutral sulphite again. This procedure, apparently so simple on paper, may, in practice, meet with considerable difficulties. But about this more later.

Rice straw is disintegrated to very fine, and at the same time, strong fibers that appear to be almost uninjured by this last mentioned process of Drewsen. The fiber diameter is about 0.006 mm. and is then actually less than that of wheat straw, 0.02 mm. The fiber length is the same as that of other straws. The pulp obtained lends itself favorably to the production of high grades of paper which, because of their strength, permits of very thin sheets (parchment paper, cigarette paper, etc.) To produce inferior kinds of paper the cooking with the neutral salts is concluded when only part of the incrustations has been removed. Pulp of medium quality is obtained with a yield of 50 to 60 per cent.

These methods are indicative of the use of neutral sulphite for straw cooking. Without exception, they are described only in patent literature and in consequence judgment as to their technical utility cannot be made. Concerning practical results or experience on a large scale no reports are available in the literature at present.

Experimental Results of Brot and Hirschel

Meanwhile, it should be of interest to add here the results of several systematic experiments obtained in recent times by cooking straw with neutral sulphites. These were conducted by M. V. Brot and M. Hirschel[28] and were directed at the cooking of pine wood and straw with neutral sodium, and especially, ammonium sulphites. By cooking cereal straw with sodium sulphite liquor of various concentrations it was found that at first the yield of pulp decreased with increasing Na_2SO_3 content in the liquor, reaching a minimum at a 4 per cent solution, after which the yield increased again. This signifies then that an excess of sodium sulphite—because hydrolysis is suppressed—inhibits the erosive action of the liquor and hence exercises a kind of protective action on the fiber. The same holds for ammonium sulphite. Comparative cooks with sulphite on one hand and with soda liquor on the other, yield the following table. (Table 1.)

TABLE 1

Na_2SO_3 or NaOH on 100 g. dry straw g.	Yield with NaOH %	Yield with Na_2SO_3 %
10	54.1	61.0
20	44.3	57.5
30	41.0	54.0
40	39.2	52.5

A comparison of these values decides throughout in favor of the sodium sulphite cooking.

The experiments cooking the resinous wood of Bordeaux pine with sodium sulphite liquor are interesting. The wood, in the shape of small cubes, containing 6 to 8 per cent resinous matter was cooked with 60 per cent sodium sulphite (based on weight of dry wood) at 180 to 185 degrees centigrade.

After 3 hours cooking the chips were poorly opened up; after 4 hours—as revealed by microscopic examination—they were well opened up. After 6 hours the fibers showed distinct signs of ero-

[23] D. R. P. 151,285 (1902).
[24] Dieckmann. Sulfit zellstoff. p. 213. (Otto Elsner, Berlin, pub.)
[25] U. S. pat. No. 1,016,178 (Jan. 30, 1912).
[26] U. S. pat. No. 1.229.422 (June 12, 1917).
[27] U. S. pat. No. 1,511,664 (1924).
[28] Papier 29, pp. 75-80 (1926).

sion and—as seen under the microscope—had a powdery appearance. The opening up then occurred suddenly between 3 and 4 hours. The pulp from a 4 hour cook had a normal appearance, but was not quite free from rosin.

From there experiments the authors conclude the following advantages for the sodium sulphite method:

1. Compared to the alkali method, it yields 10 per cent more; compared to the chlorination method 15 per cent more.
2. The unbleached pulp is lighter in color than the alkali or the sulphate process product and lighter in weight.
3. Unpleasant odors, as with the sulphate method, do not occur.
4. Iron digesters can be used; the slight corrosion of the metal does not affect the quality of the pulp. The addition of a trace of alkali would inhibit this corrosion.

For the recovery of the fixed alkalis the regeneration method of Schacht is proposed, concerning which more will be written later. The recovery of ammonia follows by distillation of the liquor with lime. For this a surplus of lime and the evaporation of three-quarters of the total volume of the liquor is required. In laboratory experiments the recovery was performed with only 2 per cent loss. It is further proposed to evaporate the residue to dryness and submit it to destrucive distillation. Concerning this the authors refer to data according to which[28] per ton of pulp there are obtained 125 kg. calcium sulphite, 250 kg. fertilizer, 16.5 kg. acetone, 15 kg. light and 10 kg. heavy oils.

Studies of Rawlings and Staidl

Exhaustive studies of sodium sulphite cooking, especially in comparison with alkaline cooking, were made by Rawlings and Staidl[29] on aspen wood. They mention first of all, that the cooking reagents show a greater ability to dissolve cellulose when a more complete removal of lignin is brought about by them. Since the action on the pulp in the presence of free acids or free alkalis is of a hydrolytic nature, it appears that to decrease the loss of cellulose the cooking should be done with neutral salts. Since organic acids occur when wood is cooked at temperatures above 100 degrees centigrade, chemicals that would preserve a neutral state should be used. Therefore, the salts first to be considered, are those of weakly dissociated polybasic acids, which, when used in excess, have the power of keeping the deviation from neutral within desirable limits. Such salts are sodium borate, solium sulphite, acid sodium phosphate, and sodium oxalate. Because of its relation to the sulphite process on one hand, and to the alkaline process on the other, the authors chose sodium sulphite, and as a matter of fact, in great excess over the amount necessary for delignification. Such an excess prevented, on the one hand, the extreme retardation of the reaction, and on the other, held the reaction of the liquor between the limits of the change of color of phenolphthalein (pH 8) and methyl orange (pH 3 to 4).

As raw material the authors used extracted aspen wood with 64 per cent cellulose and 21 per cent lignin. The cellulose and lignin content were determined by the known methods. Maintaining the temperature, (170 degree centigrade), the cooking time (4 hours), the weight of wood (15 grams) and the volume of liquor (150 cc.), constant, with varying content of sulphite in the liquor the following was obtained. (Table 2).

[28] Papier Ztg. 40 (1915).
[29] F. G. Rawlings and J. A. Staidl. Chemical Studies on the Pulping of Aspen. Paper Trade Journal, No. 8, p. 49 (Aug. 20, 1925).

TABLE 2

Na_2SO_3 used on % weight of wood	Yield of pulp on % weight of wood	Na_2SO_3 consumed on % weight of wood	Cellulose content % of pulp	Yield of cellulose on % weight of wood	Cellulose loss on % weight of wood	Lignin content % of pulp
12.8	68.7	9.0	85.9	59.0	5.5	13.0
25.8	68.7	9.0	86.6	60.7	3.8	13.8
51.3	68.5	11.9	87.4	59.9	4.6	13.1
77.6	68.4	12.9	87.4	59.7	4.8	12.0
103.3	67.8	16.0	87.4	59.3	5.2	8.2
128.9	67.6	19.7	87.6	59.2	5.3	7.6

In another series of experiments the temperature alone was varied, all other factors being held constant. Fifty per cent Na_2SO_3 based on the weight of wood was used. Cooking time 4 hours (the last two cooks were 6 and 8 hours respectively). The yields are expressed in the following table: (Table 3).

TABLE 3

Temperature °C.	Yield of pulp % on weight of wood	Na_2SO_3 consumed % on weight of wood	Cellulose content % of pulp	Yield of cellulose % on weight of wood	Loss of cellulose % on weight of wood	Lignin content % of pulp
120	90.2	0.7	73	66	slight increase	21.6
130	87.1	1.6	76	66.7	in weight due	18.1
140	84.2	3.6	78	65	to addition	16.8
150	80.4	5.5	79.7	64	compounds	16.6
160	76.7	7.4	80.6	61.9	2.6	15.1
170	68.4	18.9	87.5	59.9	4.6	13.1
180	59.3	18.4	93.1	55.3	9.2	9.1
185	57.3	19.7	94	53.9	10.6	8.1
185 (6 hr.)	50.2	28.7	96.8	48.6	15.8	6.0
185 (8 hr.)	48 7	33.7	95.5	46.5	18.0	7.4

As occurs in previous figures, the delignification rises rapidly with the temperature but even after a cook at 185 degrees centigrade, there are appreciable quantities of lignin left in the fibers. Above 170 degrees, because of hydrolysis which increases with the temperature, great losses of cellulose occur. The removal of the bulk of the lignin necessitates, in any case, temperatures at which the yield has decreased to below 50 per cent.

For comparison the authors conducted a series of NaOH cooks with aspen wood in which NaOH was used in excess (32.5 per cent based on the weight of wood), cooking at 17 degrees centigrade. Only the duration of the cooking was varied. The results are given in the following table (Table 4).

TABLE 4

Time hr.	Yield of pulp % on weight of wood	NaOH consumed % on weight of wood	Cellulose content % of pulp	Loss of cellulose % on weight of wood	Lignin content % of pulp
0.5	59	13.8	85	14.1	12.3
1.0	52	16.2	97	13.7	2.7
2.0	49	19.2	99.4	15.4	0.63
3.0	47	21.5	99.6	17.6	0.21

Here then a rapid reaction sets in so that the lignin content even after one hour has decreased to below 3 per cent (for which, with sodium sulphite cooking over 8 hours at 185 degrees centigrade, were necessary).

In another series of NaOH cooks, the digestion was done with 16 per cent NaOH with all conditions constant except that the temperature was varied. The results for 2 hour cooks were the following: (Table 5).

TABLE 5

Temperature °C.	Yield of pulp % on weight of wood	NaOH consumed % on weight of wood	Cellulose content % of pulp	Losses on % weight of wood	Lignin content % of pulp
180	57	16	93	10.8	9.0
170	58	14	91	10.7	8.7
160	63	13	86	9.6	13.2
150	68	12	82	8.3	17.5
140	71	11	78	8.3	21.0

Viewing the comparison of these two cooking methods, from the experimental results, the following is noteworthy: If less than 17 per cent of the lignin be removed, then the loss of cellulose with soda liquor is much greater than with sodium sulphite. With greater delignification, however, this relation becomes reversed. Alkali already at 140 degrees centigrade, removes other substances besides lignin. With sodium sulphite, on the contrary, these actions first begin at 170 degrees. Sodium sulphite is appropriately used for cooking at 140 degrees. In this way, comparatively high yields are obtained; the residual lignin can be removed by chlorination. The white color of the sodium sulphite pulp indicates that this reagent does not permit the precipitation or deposition of brown substances on the fibers, as is the case with alkaline cooking.

So much for the report of the American experimenters. A comparison of sodium sulphite cooking with sodium bisulphite cooking, which would be of exceptional interest at this point, was not performed.

The results obtained permit a good survey of the action of neutral sulphite on wood. It must be taken into account, however, that the results were obtained with wood previously extracted with alcohol, and for this reason conclusions concerning the practicability of this process must be drawn with caution.

Cooking with Alkaline Sulphite

In practice one certainly ought not to come around to a more or less decidedly acid of alkaline procedure. In the former case, for economic reasons, lime is the base used, but in the latter case, if the character of a sulphite cook is to be maintained at all, only alkali sulphite with addition of alkali or other salts of alkaline reaction with other acids than SO_2 can be employed. There are a large number of patents proposing such methods.

The oldest proposal of this kind comes from Thomas Henry Cobley[30] who used for cooking a caustic liquor (soda liquor, crude potash, or wood ash) together with a saturated solution of sodium or potassium sulphite (even sulphate). But the actual development of the alkaline sulphite process was first made by Schacht[31] who proposed a liquor for the cooking of straw, esparto, wood, etc., which really consisted of sodium sulphite, and which contained only so much NaOH as was absolutely essential for the cooking out of the silicates and aluminates of the vegetable matter concerned. He passed sulphurous acid into the liquor obtained from the leachings of the fusion from soda recovery until all the NaOH, Na_2S, and part of the carbonate had been converted into sodium sulphite with a slight amount of sodium thiosulphate. The rest of the carbonate from the raw leachings was causticized with lime. With such a liquor the cellulose losses are supposed to be nil, with a 10 to 15 per cent higher yield than with the soda or sulphate method. The pulp produced is stronger, lighter in color, and easy bleaching, has a negligible pentosan content, and is not, like soda pulp, readily fermented or spoiled by parasitic fungi. The properties of this pulp resemble, very nearly, those of acid, sulphite cooked pulp. The practical application of this process registered no results, and this for reasons which will be gone into with more detail further on.

The ammonium sulphite method of Braun met with a change to the alkaline side in the method by Rosenblub, Brech, and Tyborowski.[32] The patentees protected the use of ammonium sulphite in the presence of an excess of ammonia. According to their statement, neutral sulphite yields dark colored to brown pulps for the reason that during the cooking process the SO_2 set free by the plant acids attack the fibers very strongly at the high cooking temperature. To prevent this harmful action the patent holders add enough ammonia to the ammonium sulphite liquor on the chips so that one per cent free ammonia is available. The cooking time is about 10 hours. In this way there is obtained a yield of 65 per cent of bleachable pulp from dry pine wood. The presence of free ammonia, whose quantity depends upon the rosin content of the wood to be cooked, causes a comparatively high pressure (10 to 12 atmospheres at 165 degrees centigrade) and permits the cooking to be carried out at lower temperatures.

The Keebra Process

Recently a great sensation was caused by the so-called "Keebra Process" of Linn Bradley and McKeefe[33] which is very similar to the process of Schacht. The cooking with neutral alkali sulphite forms the foundation of this process. In accordance with the previously described findings of Brot and Hirschel, the patentees found that the fibers were substantially unscathed even when a considerable excess of the cooking reagent was employed. They further established that with sodium sulphite cooking much less alkali (combined) is required than when the cooking is done with NaOH alone. In many cases they add free alkali to the liquor, but this addition is not absolutely necessary; it depends largely on the nature of the raw material used. For this factor woods are divided into three groups, and are differentiated as follows:

A. Woods with little or no resinous constituents, such as poplar, birch, aspen, Canadian basswood, etc.

B. Woods with moderate rosin content as spruce, fir, hemlock and the like.

C. Woods with high rosin content as Georgia pine, jack pine, long leaf pine, etc.

For the cooking of the woods under group B sodium sulphite alkali is necessary. Cooking is done with sodium sulphite alone, and the sulphite is so proportioned that the liquor will not turn acid during the digestion. When cooking wood with water or with small amounts of sulphite, the liquor turns acid. Should more sulphite be added, however, the acid reaction ceases. "The sodium sulphite appears to combine with the constituents which otherwise would give an acid reaction." While, for example, old seasoned poplar treated with a liquor containing 20 per cent sodium sulphite (based on the weight of wood containing 10 per cent moisture) still became acid; the acid reaction disappeared with 25 to 30 per cent Na_2SO_3. For most woods 30 per cent Na_2SO_3 was the least, in some cases up to 45 per cent was used. Fifty per cent and over may be used without fear of injury to the fibers, although, on the other hand, no special advantage is gained by so doing.

For the cooking of the woods under group B, sodium sulphite liquor does not suffice because then various resinous constituents are retained. The addition, however, of small quantities of alkali (soda liquor) commends itself, and indeed, only towards the end of the cook. Should alkali be added to begin with, darker pulps and darker liquors result.

The woods mentioned under class C are cooked in two stages. In the first stage the cooking is done with a liquor containing 35 to 40 per cent (based on the weight of wood) of sodium sulphite, and at a pressure of 120 pounds per square inch (8.5 atmospheres) for 4 hours. The liquor is then drawn off and the cooking in the second stage done with a liquor containing 20 to 25 per cent Na_2SO_3 (on weight of wood) with the addition of 1 to 3 per cent NaOH (on weight of wood) for the same length of time and at the same pressure.

Advantages Claimed for the Keebra Process

The advantages of the Keebra process are supposed to consist of the following points:

1. In contrast to previous methods, yielding 38 to 45 per cent on the average, this method gives substantially higher yields of pulp. Thus the yields were with old poplar 61 per cent, with young poplar 67 per cent, with hemlock 50 per cent.

2. With the aid of this method a series of wood species may be drawn upon which heretofore could not be successfully cooked with the sulphite process. This holds especially for woods rich in rosin. Also a mixture of woods of similar characteristics can be

[30] D. R. P. 21,268 (1882).
[31] D. R. P. 122,171 (1900). D. R. P. 131,118.
[32] D. R. P. 271,544 (1911). D. R. P. 252,321.
[33] D. R. P. 375,053 (1923). Brit. pat. 105,434. Also Can. pat. 219,557 (June 13, 1922). (See Tech. Assoc. Papers IX (1926), p. 137. J. D. Kue: Soluble sulphites and their bisulphites in the pulping of wood. Also Paper Trade J. 77, p. 51, Sept. 6, 1923: The Keebra process.)

treated by this method. The knots of sap bearing trees, which present abundant difficulties in the usual sulphite process become, substantially, as completely delignified as the other parts of the wood, so that a uniform pulp results.

3. The spent liquors by the Keebra process differ fundamentally from those occurring in other processes. They are almost completely free from decomposition products of the pulp and, upon replacement of the original sulphite content may be used over again as many as five times for cooking. The concentration can be raised to 200 grams per liter. The same holds for the liquors for the two-stage process. For the recovery of the base there are then a smaller amount of water to be evaporated than in the case with the use of weaker liquors.

4. Because of the substantially unscathed fibers, long fibered pulps are obtained; even the short fibered poplar wood yields a pulp which, on the whole, is very similar to a long fibered one. The quality of the pulps is appreciably improved, and they are easier to bleach. This holds even for pulps made from Southern pine.

5. As further advantages it is asserted that no annoyances due to offensive odors occur and that the digesters do not require lining.

Doubtless there is much to be said for the general utility of the process, especially since attention is drawn to certain kinds of wood hitherto not possible to pulp by means of the sulphite process. The possibility of reusing the same cooking liquor several times proclaims a step toward the fuller utilization of the expensive alkalis. Whether or in what circumstances the general reuse of the liquor affects the quality of the pulp produced, is a question at present unanswerable. However, one cannot avoid a recovery for alkali.

Chemical Recovery in the Keebra Process

Concerning the difficulties which such a regeneration entails, Schacht reports in 1923.[34] He had laid down the fundamental idea of the Keebra process already in 1901, in the patent literature previously mentioned. He had established at that time that sodium sulphite dissolves the woody incrustations exceptionally well under high pressure and that a very light colored, strong pulp, was obtained with a good yield, the fibers being quite undamaged. However, the recovery of the alkali salts presented difficulties so pronounced that because of them the application of this method on a large scale was a failure. Schacht writes concerning this:

> "In evaporation of the liquor the sulphuric acid salts wrought such havoc with the evaporators that in a short time their capacity became very much reduced. The higher the temperature of the evaporator, the greater was this trouble. Also, during the evaporation sulphides were formed which corroded the condensation and vacuum pump systems very seriously. These sulphur compounds in the recovered fused salts varied very much in quality and activity. Because of this, on reproduction of fresh liquor, a number of salts were obtained that were not conducive to the pulping of vegetable matter.
>
> "For this reason the difficulties in recovery of chemicals from spent liquors offset the advantages of the monosulphite process, and these defects increase in the course of prolonged manufacture, since the liquor and the salts recur in uninterrupted cycles."

Schacht here appends the suggestion that mills that work according to the De Vans process might perhaps use a sodium sulphite cooking to advantage, instead of the soda liquor used in the first stage, since in these plants the salts are not recovered from the liquor anyway. The present method of cooking with NaOH yields slimy pulps; and it is very probable that with less slimy pulps, chlorination would occur more completely. For this reason the bleaching action in the precooking with sodium sulphite is more significant.

The difficulties of alkali regeneration expressed by Schacht hold for all sulphite processes in so far as fixed alkalis predominate as the base. This is what hinders the utilization on a large scale of a process which otherwise appears so advantageous. Without alkali recovery, however, all such processes are at once condemned as uneconomical. The alkali recovery methods practised in the sulphate and soda processes do not permit of application to the spent liquors from sulphite cooking, which contain considerable quantities of sulphate, sulphide, and thiosulphate. Here lies the cardinal point of the sulphite process with alkali as base. It is no wonder then that the domestic and foreign patent literature contains such a large number of propositions which aim at a cheap recovery method, a more thorough utilization of fresh liquors, or an economic application or a regeneration of waste liquors.

Recovery Methods Proposed

Thus, a Canadian patent[35] suggests the addition of an ammonium salt to the spent liquor, whose acid would form a salt causticizable with lime. Another Canadian patent[36] would spray the spent liquors into a hot atmosphere of SO_3 and CO_2 vapors. Still another Canadian patent[37] the spent liquor is regenerated by means of SO_2 or bisulphite. For the preparation of fresh liquor a Canadian patent[38] proposes the treatment of sodium sulphate or bisulphite with SO_2 in the presence of lime. By the treatment of the spent liquors with sodium bisulphite a Canadian patent[39] would accomplish the precipitation of organic matter. Harnist[40] proposes cooking with potassium or ammonium sulphite with special regard for the utilization of spent liquors. After the precipitation of the tannin-like matter by heating and perhaps a previous fermentation, the liquor should find use as a fertilizer because of its potassium and nitrogen content. Richter[41] combines the sulphite and sulphate methods. The fusion of the chemicals from the liquors is done in two ovens, partly reducing (Na_2S and Na_2CO_3) and partly oxidizing (Na_2SO_4 and Na_2SO_3). The melts from the first oven after causticizing are, if necessary, used as the alkaline liquor for the sulphate process, while the melts from the second, after acidifying, give a liquor for acid cooking method. (The process is, in general, very complicated.)

None of the many propositions made in regard to the problem, from which those mentioned are but a selection, has, up to the present, relieved the difficulties and made possible the introduction of sodium sulphite cooking on a large scale.

Chauchak's Cooking Method

An alkaline cooking process, in which only small amounts of alkali sulphite are added, was worked out by Dimitry Chouchak[42] and, as a matter of fact, for the special purpose of cooking esparto. Alkali sulphite or bisulphite added in quantities of from 2 to 0.01 per cent to the cooking liquor are supposed to have accelerating influence on the reaction. This addition can succeed with normal cooking liquors for esparto, but this process appears more economical when a special procedure is adopted, which may be distinguished by the following points: After cleaning and cutting up raw material it is soaked in the cold, first in acids and then in alkalis. These solutions are very dilute and contain catalysers (sodium sulphite) and protective substances (aniline) in the proportions given. By this treatment the bulk of the incrusting material of the esparto fibers is removed. After draining, the material is put into a solution of 2.5 to 3 per cent NaOH to which the same substances have been added. Five to 7 per cent of the alkali by weight is taken up by the material. Sulphite, on the contrary, is hardly taken up at all, so that the solution, after adding alkali up to the original amount can be used over again several times. The soaked material is heated in a digester at 140 degrees centigratde for 20 to 30 minutes; with direct cooking care must be taken, however, that the solution soaked into the fibers is not diluted too much by condensate. Water (as steam) to the amount of six times the

[34] Wochenbl. fur Papierfr. 54, p. 2851 (1923).

[35] Can. pat. 236,528.
[36] Can. pat. 236,531.
[37] Can. pat. 236,532.
[38] Can. pat. 246,302.
[39] Can. pat. 236,530.
[40] Brit. pat. 156,777.
[41] U. S. pat. No. 1,519,508 (1924).
[42] Fr. pat. 515,501 (Nov. 26, 1920). See Papier 24, p. 213, 214 (1921).

weight of the plant material should suffice for heating. In this way only 6 to 7 per cent of alkali instead of 12 to 15 per cent is required for cooking. Under normal pressure the cooking can be finished in two hours. A light colored fiber should result which requires much less chlorine to bleach than that required in other methods.

Cooking with Liquors of Other Composition

There are now only one other series of methods to be described, —those in which, besides sulphurous acid, other stronger acids, bound to alkali occur in the cooking liquor. As a matter of fact, Schacht's liquor besides sulphite contained small amounts of thiosulphate. This last is supposed to have a favorable effect on the cooking action; according to one Canadian patent[43], one can even cook with thiosulphate in alkaline solution.

Müller and Heigis[44] propose liquors for the cooking of highly incrusted plants as jute, manila, reeds, esparto, etc., which are different from Schacht's liquors only in that they are weakly alkaline and that besides sodium sulphite they also contain sodium acetate. With the help of this liquor extensive delignification is possible without noticeable injury to the fibers. In particular, in this way white, shive-free pulps, are obtained. The treatment of the liquor is accomplished by acidifying it with sulphuric acid or bisulphite and distilling off a mixture of sulphurous and acetic acids which is led into the leachings from the alkali smelter, and thus the original liquor is regenerated.

Braun's Process

C. A. Braun[45] suggests a liquor for the cooking of cellulosic raw materials which besides sodium sulphite also contains sodium sulphide and some weakly combined alkalies. In this way the alkalinity of the liquor is decreased to a definite minimum value. Straw, typha, and reeds, after a 6 hour cook with 25 kg. Na_2SO_3 and 7 kg. Na_2S (made up to 700 liters for 100 kg. chopped straw) yield pulps which can be bleached to a highly white color with 14 per cent chloride of lime. The sulphurous acid is cooked down to 0.2 per cent in this method. For jute and nettle stalks a liquor is prescribed which contains 15 kg. of soap or soda, 10 kg. Na_2SO_3, and 5 kg. Na_2S in 700 liters (for 100 kg. of raw material). It is cooked for 4 hours at 135 degrees. The jute pulp can be bleached with 20 per cent chloride of lime. The fibers from the nettle stalks show a high degree of whiteness and a strength that surpasses considerably that of linen fibers. Some raw plants like nettle and linen are green when they come from the digester; this is attributed to the formation of reduction products of chlorophyll. In such cases Braun[46] adds caustic alkalis, by means of which the reduced dyestuffs are removed. The soaking procedure may also be advantageously carried out with the liquors described[47]; replenishings with alkali may be decreased thereby. Aided by vacuum, the raw material is saturated with a liquor either under pressure or by soaking several hours. The liquor used (for 100 kg. raw material) contained 25 kg. Na_2SO_3 and 6.5 kg. Na_2S in 200 liters. The liquor is then drained and the material, which has taken up about twice its own weight (when well dried) of liquor, is cooked for 2 to 3 hours. In this way a light colored pulp free from shives is obtained.

In more recent times C. A. Braun[48] has proposed other liquors for the cooking grasses and slightly incrusted plants like straw. reeds, bamboo, and material containing chaff, such as manila hemp, jute, and flax and hemp tow. These liquors combine favorable cooking action with the advantage of greater economy, since the cooking agents are used in comparatively small amounts when based on the raw material. The actual components of the liquor are sodium sulphite, sodium silicate and caustic soda. The last is necessary, however, in only a few cases. For 100 kg. of reeds 200 liters of a liquor with 4.5 per cent Na_2SO_3 3.5 per cent sodium silicate and 0.5 per cent caustic soda is prescribed. The cooking is done at 165 degrees Centigrade for 4 or 5 hours and gives a high yield of pulp of light color, easy bleaching, and with good characteristics. The silicic acid, as one might expect, does not precipitate because of the plant acids developed during the cook, but instead the cooking liquor remains clear and at most takes on a faint opalescence. Up to the end of the cook there is a surplus of combined SO_2, which must be present if the digester contents are not to become brown.

It must be assumed that even the silicic acid in some way takes part in the cooking action. Contrary to experiences with spent liquors from straw rich in silicic acid, the regeneration of these liquors offers no difficulties.

The liquors described are not suitable, however, for the production of half stuffs. Since to maintain a profit in the production of half stuffs only small amounts of SO_2 are employed, this sulphurous acid is either completely used up and a strong brown discoloration develops which cannot be gotten rid of with chlorine in economically reasonable amounts, or else, the sulphurous acid is cooked down only to a certain degree, in which case the product is raw, and a pulp, full of shives, results. The consumption of SO_2 is, however, very rapid and is complete before a sufficient degree of cooking action is attained. We get a completely different picture, however, if alkali sulphite is used together with salts of weak acids which do not set free sulphurous acid and which do not attack the digester. As such a salt C. A. Braun[49] suggests sodium bicarbonate. Weak solutions of sodium sulphite and sodium bicarbonate give well cooked half stuffs at 160 degrees Centigrade. By this method the sulphurous acid is cooked down to a few hundredths of a per cent.

Concerning practical results with the methods just mentioned nothing further as yet has become known. In principle it appears certain that the cooking of grasses and similar raw materials is impossible with acid cooking methods, and possible only with poor yields and mediocre quality in the alkaline processes. Further, by means of an alkaline sulphite cooking with the addition of alkaline substances it appears that it would be possible to produce pulps of technically satisfactory quality and yields. However, here too again occur the difficulties of alkali regeneration that hinder the large scale technical application of these processes.

C. Methods with Mixed Base Liquors

We turn now to those methods in which mixed bases occur in the liquor, i.e., larger or smaller amounts of alkali salts are added (in reality sodium salts) to the ordinary lime or magnesia bisulphite liquors. In all such cases, if practically no alkali in the form of bisulphite has been previously added, a formation of such a bisulphite occurs, due to an equilibrium reaction between calcium bisulphite and the soda salt. Alkali bisulphite, however, appears to have a decided influence on the cooking yield. This observation is noted in all of the patent writings that follow, regardless of whether the alkali predominates as the base or whether it is added only in small amounts to the calcium bisulphite liquor. One must assume, obviously, a specific action, which may perhaps be due to the sodium ion and be of a catalytic nature; perhaps there is also colloidal chemical behavior involved, possibly also purely physical considerations. The views concerning this are, at present, still widely divergent, and it would be a worthy task, while no easy one, for scientific research to clarify this situation. At present it can only be asserted that the action of sodium through its salts does affect the action, and that further, the Serlachius process, described later using this idea, has been successfully applied technically on a large scale.

Process of Drewsen and Dorenfeldt

Of the many methods of procedure employing this addition of sodium salts to sulphite liquor, the next to be mentioned is that

[43] Can. pat. 246,477.
[44] D. R. P. 284,681. (See also Brit. pat. 156,512, Jan. 5, 1921. Ed.)
[45] D. R. P. 309,181 (1916).
[46] D. R. P. 309,236 (1918). (See U. S. pat. No. 1,387,441, Aug. 9, 1921. Ed.)
[47] D. R. P. 364,992 (1919).
[48] D. R. P. 400,858 (1923).
[49] D. R. P. 397,927 (1923).

of Drewsen and Dorenfeldt,[80] protected in an Austrian patent. It consists of adding sodium sulphate to the sulphite liquor, whereupon insoluble gypsum and sodium bisulphite result. About two-thirds of the lime is so precipitated. The cooking with such lime-soda-bisulphite liquors yields desirable pulps which can be bleached with 5 per cent of chloride of lime and which may be overcooked without any harm. For recovery, the liquor is neutralized with caustic lime and calcined. In this way the sodium sulphate that had been added is recovered as sodium carbonate. Just how this method, which aroused many denials at that time[81], was utilized in practice cannot be determined. The same holds for the Crocker process which according to Griffin and Little[82] used a liquor made up of lime bisulphite, sodium sulphate, and sulphurous acid.

Drewsen[83], in order to inhibit staining during the cook, proposed to permeate the material with a suitable liquor. As such a liquor neutral alkali sulphite is recommended, (Na_2SO_3 or weakly acid $MgSO_3$) containing, for example, 4 parts Na_2SO_3 7 aq. in 100 parts of water. After the soaking, the regular cooking process with lime bisulphite is proceeded with. Actually then Drewsen cooks with a soda containing lime liquor. There are only small amounts of soda contained in the liquor. The same holds true for the Bache-Wiig[84] process, according to which a small amount of sodium chloride (0.5 to 3 per cent) is added to the ordinary sulphite liquor. This forms, by double displacement, sodium sulphite or bisulphite, which has a better action on the fibers than lime bisulphite. The resulting chlorides of lime and magnesia have, in the opinion of the patentee, a definite bleaching action and accelerate the penetration of the liquor into the raw material. The addition of salts prevents, or at least inhibits the formation of hydrocellulose, so that the yield increases 4 to 6 per cent. Experiments have shown that one can get along with lower cooking temperatures. The patentee ascribes the advantages observed chiefly to the physical penetration of the sodium chloride, since in chloride-free bisulphite liquor these advantages do not occur so markedly.

Advantage of Alkali Sulphite Method

The addition of alkali sulphite to ordinary cooking liquors is of exceptional interest in connection with the cooking of woods which have difficulty soluble incrusted matter and a high content of coloring matter as, for instance, red beech. In such cases the alkaline process gives poor yields and a dark colored pulp which takes a great deal of chlorine to bleach. With acid methods there are even greater difficulties; the pulp readily takes on a gray blue color, due to absorption of acid, which cannot be removed with water, and which turns red brown to brown yellow with chloride of lime. Further, lime sulphite precipitates on the fibers; also, the reduction of the coloring matter in the interior of the wood is most incomplete, so that yellowed fiber bundles remain. The much stronger decolorization brought about by alkali sulphite is used by C. A. Braun[85] for the cooking of these woods, the liquor containing lime bisulphite and sodium bisulphite. For economic reasons, the sodium sulphite was technically replaced by magnesium sulphite which has a nearly similar action.

In the cooking of resinous woods the addition of alkali plays an entirely different role. In such cases, as for instance, with pine, ordinary cooking methods with lime bisulphite liquors are without results because the liquor is unable to remove both lignin and rosin in sufficient quantities. It was then found that even magnesium bisulphite brought about an improvement, inasmuch as the rosin content of pulps so cooked was only two-thirds that of pulps cooked with calcium bisulphite[86]. The action of alkali bisulphite is even better. Experiments by McKee and Cable[87] showed that for these pulps a special rosin emulsifying agent is required. For instance, the investigators, using the heartwood of pine, which could not be cooked with calcium bisulphite, readily cooked it with sodium or ammonium bisulphite. Even small amounts of alkali sulphite, when added to the ordinary cooking liquor, showed this effect. The use of such a liquor is the central idea of the Alfthan-Serlachius process[88]. The fundamentals of this process, which, in the last few years, has found technical application in Finland and France, are as follows:

The Alfthan-Serlachius Process

Solutions of soda or soda liquor (or sodium sulphate) are put into the digester only in such amount that there is at most 1 per cent Na_2CO_3 calculated on the weight of the cellulose in the wood. To this is added a lime bisulphite liquor with 3.5 to 4.5 per cent total SO_2 and 0.8 to 1.5 per cent combined SO_2. The cooking is done at somewhat higher pressures and lower temperatures than in the sulphite process. The most favorable conditions are 5 to 6 atmospheres and 130 to 150 degrees. Experience has demonstrated that the liquors described are able to cook, under the given conditions, not only pine wood, but also Finnish fir, the pulp of which is fully equal in quality to that of spruce and white fir. This information was confirmed by analyses, conducted by Sieber[89] in the Central Laboratory at Abo, in which the rosin content of spruce pulp is compared with that of the Serlachius cooked pine pulp.

	Spruce pulp	Pine pulp
Alcohol extract, per cent	1.85	1.65
Ether extract, per cent	1.41	1.32

Sieber considers this result to be quite remarkable since calculation shows that 60 to 70 per cent of the wood resins were removed during the cook. Regarding the question of how the action of the alkali bisulphite is to be explained, he refers to the views of Senwalbe according to which acid liquors containing alkali bisulphite have the unique property of swelling the otherwise impentrable resinous pine wood in some way which enables the liquor to penetrate. Since, because of the small quantities of alkali bisulphite present no important chemical reaction involving it could take place, one must assume that collodial chemical action plays a part.

Application in France

The Serlachius method, first applied in Finland, was recently (1924) taken up in southern France,[90] where there are extensive forests, the principal tree being a conifer "Pinus Maritima". This pine has a comparatively high rosin content and is for this reason used for producing turpentine. At Motech (Tarn et Garonne) a sulphite mill was built after the war which was to get its wood from the north. While still under construction, such a rise in freight rates occurred, that profits became questionable since the pulp prices had not risen correspondingly. Under those circumstances it was decided to use the wood from the neighboring forest (Pinus Maritimus) and to cook with the Serlachius process.

The results of several large scale experimental cooks are given:

Cook 1. Wood partly rotten and blue. About 40 to 60 years old. Average moisture 23 per cent; Rosin 3.2 per cent.

Cook 2. Fresh wood of rapid growth 20 to 40 years old. Average Moisture 20 per cent; Rosin 5 per cent.

Cook 3. Same as Cook 2. Moisture 18 percent; Rosin 4.5 per cent.

The average of the results of these three cooks gave the following figures:

Total wood (dry weight)	22,200 kg.
Time of cooking	14.8 hours
Pulp with knots (dry weight)	9,274 kg.
Clear sulphite pulp	7,922 kg.
Pulp on weight of wood	35.7%
Knots	6.1%
Total pulp on weight of wood	41.8%

[80] Papier Ztg., 1894, p. 2715.
[81] Papier Ztg., 1894, p. 2877.
[82] Chemistry of Paper Making. New York, 1894. p. 230.
[83] U. S. pat. No. 730,439 (1903).
[84] U. S. pat. No. 1,240,920 (1917). See also U. S. pat. No. 1,240,970, Sept. 25, 1917. Ed.
[85] D. R. P. 279,517, June 17, 1913.
[86] Schwalbe. Papier Fabr. 925, Festheft, p. 99. See also Schwalbe and Berndt, Papier Fabr. 22, Festhet, pp. 67-71 (1924). Ed.
[87] Paper Trade J. 80, No. 17 (Apr. 23, 1925), p. 151. (McKee and Cable, Liquid sulphur dioxide process for sulphite pulp.)
[88] U. S. pat. No. 1,507,539. D. R. P. Anm. S. 63,991 (1925).
[89] Sieber: Ueber das Harz der Nadelhölzer und die Entharzung von Zellstoffen. Berlin, 1925. p. 113.
[90] Paper Trade J. 81, No. 8, Aug. 20, 1925, p. 52.

Various kinds of paper were made from this pulp. One paper containing half sulphite and half waste papers (50 per cent ground wood) had a weight of 92 grams per square meter (or according to another size, 25x38-62.17/500). Also, greaseproof paper could be made from 100 per cent sulphite, giving a weight of 48 grams per square meter, or according to another size (24 x 36-28.33/480). Tested by the Schopper method it gave a breaking length of 3800 meters. In all cases the pulp was easy to work with; no rosin troubles were encountered.

The Serlachius process aroused great interest in the United States and Canada where the possibility of utilizing hitherto unusable species like Southern pine and others caused lively attention. The inventor, the Finnish engineer Serlachius, awaits the time for the introduction of this process in America.

Conclusion

With this we come to the end of our journey through patent literature and other publications concerning sulphite cooking with alkalis as bases. Reviewing, in closing, the path traversed, and examining the economic possibilities, we see that the prospect for the technical application of acid methods with alkali as the base for ordinary woods is not so slight as it would seem, in view of the compulsory alkali regeneration situation. The strong cooking action of the liquor combined with the higher bleachability, giving higher quality of pulp, in some circles, have led to an earnest consideration of the introduction of the large scale technical process. This is especially true of such mills as produce both sulphite and sulphate pulps and would thus be able to run the spent liquors through the sulphate liquor recovery plant. Further future possibilities of the alkali or ammonium sulphite and ammonium bisulphite methods depend upon their application to those raw materials which with other methods cannot be cooked, either insufficiently or not at all. In this respect the methods of Serlachius and of Drewsen and of Braun take on a certain significance. The first has the advantage of being independent of alkali recovery. Its field of usefulness lies in the cooking of highly resinous woods, which, some day will become general, in view of the growing demand for pulp. No less important, however, are the possibilities indicated by the latter methods for converting into valuable pulp the grasses, straws, and similar raw materials which are available annually in great abundance. These methods are dependent upon a suitable recovery process for alkali; unless the quality of the pulps so produced will be so high that the consumption of alkali will not be of economic importance,—and of this there is yet no sign. Should one succeed in finding some way of technical utility then, without a doubt, these methods would become highly important technically. Perhaps then, an old dream of the pulp chemist would materialize, one that would have a combination of chlorine-alkali electrolysis with the sulphite process, which MacNaughton[a] sketches about as follows:

From ordinary salt chlorine and alkali are obtained.

Clorine with lime yields the bleaching agent.

Alakali with SO_2 gives sodium sulphite or sodium bisulphite as the cooking agent of the liquor.

The recovery method for the liquor would be the removal of organic matter (from which by-products could be obtained) and replacement of the original sulphite content. Only the lime is lost; its recovery being deemed unprofitable. This cycle would be even more complete if the recently developed processes for electric regeneration of liquors would lead to satisfactory results. It would then be possible to recover, besides heat and organic matter, sulphurous acid and caustic soda.

The review as given shows, at any rate, the interest and activity with which radical modifications of the sulphite process are adopted, especially in those foreign countries in which, sooner or later, a lack of suitable raw material threatens. It is to be expected that in the near future more will be heard in the American trade literature concerning the practical results obtained with large scale sodium sulphite cooking, and then a clearer and more complete picture of the value of these methods can be made than can be drawn from patent literature alone.

[a] Paper Trade J. 76, No. 12, p. 52, Mar. 22, 1923.

Plans for Superintendents' Meeting

Carl Magnus, of the Standard Paper Manufacturing Company, general chairman of the committee of arrangements for the eighth annual convention of the American Pulp and Paper Mill Superintendents Association, to be held at Richmond, Va., May 26-28, announces that plans for the meeting are progressing most satisfactorily.

Thursday afternoon specialized meetings will be held as follows:

"Chemical and Mechanical Pulp"—Chairman, J. A. Bowers, Hammermill Paper Company, Erie, Pa.

"Board and Coarse Papers"—Chairman, Charles L. Ellis, Downingtown Manufacturing Company, Downingtown, Pa.

"Book and Fine Writings"—Chairman, W. S. Brooks, Champion Fibre Company, Canton, N. C.

"News Print"—Chairman, George K. Walker, Finch-Pruyn Company, Glens Falls, N. Y.

An innovation on this year's program is a section on "Mechanical Appliances," with H. S. Harrigan of the District of Columbia Paper Mfg. Company, Washington, D. C., as chairman. This section will hold an open meeting Saturday morning.

These division chairmen with the leaders of the sub-divisions are all working hard to present an instructive program. They welcome, as well as the genreal chairman, any suggestions or pertinent subjects for discussion.

Outside of these divisional discussions and pending papers, definite papers have been arranged as follows:

"Wood Utilization," Edward Eyre Hunt, Department of Commerce, Washington, D. C.

"Forestry and the Pulp and Paper Industry," D. A. Crocker, Woodlands Section, American Pulp and Paper Association.

"Color Problems of the Paper Mill and Their Elimination," Dr. August Merz, Heller & Merz Company.

"The Degree of Hydration," Harry Williamson, Champion Fibre Company, Canton, N. C.

"Alpha Cellulose and Its Treatment in the Paper Mill," Mr. Nourse, The Brown Company, Portland, Maine.

"Bleached Sulphate vs. Sulphite in Fine Papers," H. A. Helder, Champion Fibre Company, Canton, N. C.

"The Use of Copper in Pulp and Paper Mills," R. A. Burroughs, Norfolk, Va.

"Is the Training of Workers by Means of Educational Classes, Bunk?" J. Norman Spawn, Educational Director, Champion Fibre Company, Canton, N. C.

The joint banquet of the men and ladies will be held on Thursday night, followed by an informal dance.

Friday afternoon will be devoted to plant visits and sight seeing trips in America's most historic city.

Separate banquets for the men and ladies will follow Friday evening, at the conclusion of which a special Southern entertainment will follow.

Railroad for Tumwater Paper Mills

A railroad line extending from Tumwater, Wash., out to the new Tumwater Paper Mills will be built by the Northern Pacific at a cost of from $12,000 to $15,000, according to an announcement from Theodore Osmund, president of the paper mills, and R. L. Shepherd, assistant secretary-treasurer. The extension will require laying some 1,800 feet of rails and recapping the old bridge on the route over the Deschutes, ot bring the road into the property of the mills. Work is to start at once.

Section of the

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Conducted by THOS. J. BURKE, C.A., Sec-Treas

New Methods Increase Production*

Financial Policies and Methods of Reorganizing Accounting, Cost and Production Operations, Which Produced Substantial Savings

By Henry P. Wherry, V. P. & Genl. Mgr., Reddaway Belting & Hose Co.

Financing of manufacturing operations in any company naturally depends to a great extent upon the financing of sales activities. Few Companies, even the small ones, now proceed with the making of articles until they examine their sales possibilities as a basis for manufacturing schedules. If the sales outlook is bright, the superintendent in charge of manufacturing will have little difficulty in persuading the treasurer to furnish him with funds to buy equipment and materials to carry on production.

Manufacturing Budget

The manager's problems here are much simpler in co-ordinating the activities of the two departments, because the manufacturing department deals with concrete factors. Cost of labor and materials can be closely estimated. The kind of equipment required and its price and maintenance costs are definitely known. The total funds required to carry on manufacturing operations to meet established sales schedules, can be very definitely calculated. A monthly budget of such expenses is very easily worked up. While the tendency of the manufacturing department is to set high figures on such estimates the financial department can usually have the values adjusted so that there is very little variation from the estimates in the manufacturing expenses as they actually work out.

The purchasing agent must be consulted in working up a financial program. While he may operate successfully on a budget, he increases the value of his department to the company if he has the opportunity to take advantage of unsuually favorable markets when they develop. Generally, however, it is unsafe to gamble on semi-finished or finished products required in manufacturing operations. With actual raw materials, such as cotton, wool, ore, wheat, etc., the case is different. Buying such items in quantities on low markets is advantageous. These raw materials can usually be resold, often at a good profit, if the company's own manufacturing program is cut on account of slack business. Materials which have undergone processing and are bought in the partially finished state cannot be disposed of in most instances, and may lie idle for a long time, tying up money which should be available in the form of cash to tide over a period of stringency. The responsibility of the manager in the small plant is to become acquainted with the problems of the purchasing agent so that he can exercise discretionary judgment in cases where heavy demands are made upon the financial department for the purchase of materials.

The organizing and operating of adequate accounting and cost systems is one of the most necessary duties of the financial department. Without such systems, cooperation with the other departments is impossible. In the first place, sales and manufacturing activities cannot be successfully conducted in the present day of narrowed profit margins unless financial data on the operation of such departments is collected, compiled and analyzed. Adequate records show at once whether selling and manufacturing are on a profit-paying basis. They also enable the company to plan future programs intelligently. The information they convey enables the treasurer to do his part in correlating activities so that the company is always able to maintain a sound financial status.

The manager of the small plant is called upon personally to check up on the operation of accounting methods. Unless he does so, the financial department usually will develop a too highly refined system, or else neglect to provide for some of the most useful records.

Cost Accounting Expense

The small company cannot afford to pay for the installation and operation of systems which yield the complete detailed information found necessary in a large organization. In plants of considerable size manufacturing operations are extensive, and small details cannot be neglected because the sums involved aggregate into large totals. But in the small company many such items require little attention. The object is to assemble correct information quickly enough to guide the affairs of the company safely and wisely. By the time refined details can be collected and analyzed in the accounting department of a small plant, the opportunity to use the information effectively usually has passed.

A cost system suited to the requirements of the particular business is so much of a necessity and in such common use that but little need be said about it. Reliable data on actual costs, and information upon which to base future cost estimates correctly, are all that is demanded. The cost system probably will be administered under the financial department, but it should co-ordinate its work as closely as possible with production. If the manager of the small company can secure his cost data promptly and knows it to be correct, he can safely omit some of the details of cost work which the complicated organization of the large company makes necessary.

Simplicity Is Essential

Besides possessing simplicity, the cost department must operate at little expense. Only a few people can be employed. Forms must be few in number. Requisitions on the storeroom for mate-

* From Manufacturing Industries.

rials, when filled, can be sent to the cost department and used to calculate the costs of such materials. Time tickets correctly designed furnish the basis not only for the payroll but also for labor cost calculations. Material and labor costs for repairs can be gathered, on the same kind of forms. Data on equipment and supplies issued from the storeroom are obtained in a similar way. Items purchased for special purposes and not going through the storeroom can be accounted for through a purchase ledger. Salaries, administrative expenses and other overhead items usually are entered directly on the books so that the cost department can use them readily.

With these data on hand, and a good cost clerk to compile them, the small plant has enough records to answer almost every cost purpose. Compilation, presentation and analysis of such figures in useful and understandable form is the basis for financial control of the enterprise. This task probably causes the plant manager of the small industry more trouble than any other single factor. The services of a statistician who is able to pick out the facts necessary, prepare them in the form of suitable tables or charts, and point out the significance of trends in the various departments, as well as for the business as a whole, would solve the difficulty. But a good, broad-gage cost man who keeps abreast of modern practice usually can handle the analysis with beneficial results and should by all means be placed in a position to do so. Unfortunately, the high cost of engaging a statistician who is fully capable of analyzing the facts and trends correctly, places such a man beyond the reach of the small company, and few plant managers, who are possessed of the qualifications required for successful administration, have also the necessary outstanding statistical ability.

Other Duties of Financial Department

Among the other duties with which the financial department is charged are the ascertaining of gross profits on the various lines of product, finding out the most profitable products, handling credit and collections, and building up reserves for contingencies.

Gross profits can be calculated if the accounting system is adequate. Finding out the most profitable products is a longer process and requires assistance of the production and sales departments, especially when it comes to the useful application of this knowledge.

Credit and collection work must be carefully performed. Losses from bad debts running up into large sums of money affect the financial situation very quickly in a small plant. Hence care must be exercised in the granting of credit, although unnecessarily strict provisions will turn away trade that will be seriously missed. Collections have to be followed up, but the small plant must exercise discretion and use special measures to preserve the good will of customers. Tactless pressure cuts off the chances of future orders. Customers are careful in their dealings with large corporations, but have little hesitancy in throwing over the company operating on a small scale.

The small plant is well fixed if it can build up ample reserves for contingencies. Bad debts, slow collections, obsolete materials on hand, unforeseen expenses in marketing products, unusual demands for experimental work, and periods during which the plant is on low production, are only a few of the many things which at times bring severe strains upon the finances. Funds which can be spared from sales and manufacturing activities and put aside for such purposes will often tide the company over some critical period. The small plant usually finds the demand upon its money from the operating departments so heavy that it cannot build up large reserve funds. But it should set something aside, however small. Otherwise these contingencies usually have to be met by a readjustment of sales or manufacturing schedules, or by borrowing from banks.

Solving Financial Problems

Financial problems of this character usually devolve upon the manager for solution, whereas the large plant probably has its finance committee to handle such situations and, because of its reputation and the prestige of its directors and executives, as well as its ability to keep losses from such sources comparatively small, weathers the storm with less difficulty.

On top of all these duties, responsibilities and problems which he shares with his assistants who are in charge of selling, manufacturing and financial operations the manager of the small plant has difficulties peculiar to his own office. He alone is responsible for the organization of the business into an effective profit-making enterprise. He must study out the correct functions of management in his company and must see that he fulfills these functions satisfactorily. His administrative task covers not only the co-ordination of sales, manufacturing and financial functions so that the heads of the various departments co-operate with each other, but also involves the performance of much actual work himself. He may, in fact, head up any one or more of the departments and actively direct their affairs.

Upon the plant manager also rests ultimate responsibility for the success of the entire enterprise. He may be one of the executive officers and perhaps hold a place on the board of directors, or he may be engaged by the board as general manager. In any case he is held accountable by the board and by the stockholders for the carrying on of the business. Hence, when laying out any plans and putting them into execution, he must think not only of the operating side of the business but also of the reaction upon the board of directors and the stockholders.

Interest of Stockholders

In most cases the stockholders of a small company take a more personal interest in its affairs than do the majority of stockholders in a large corporation. The small company has comparatively few who are financially interested in it. These few may be business men or bankers, and may watch the affairs of the company very closely, perhaps even holding executive office. On the other hand, they may be merely investors who follow up the developments of the business only at the time of the annual meeting, and the executives themselves may place the whole responsibility upon the general manager and exercise no personal administration over the operation of the company. But whatever their activities, they are all interested in profits. The manager must adjust himself to whatever set of conditions he faces, and be in a position to lay facts before the officers periodically, or at any time they require.

Industrial, economic and social conditions have introduced new elements into business. Trade associations have been formed in a number of industries and their growth is certain to continue. The manager of the small plant must represent his company in the association and handle its relations with other plants in the same industry. Co-operative efforts may be undertaken and the manager must decide just how far he can participate in them with benefit to his own enterprise.

The co-ordination of activities is not limited to plants in the same industry. It may include several different industries, particularly if they are in the same region. Apprenticeship training is one example of such mutual undertakings. The small plant may profit more than a large one by such co-operation and it is the manager's job to measure the possibilities, lend whatever assistance is advisable, and secure the maximum benefit possible in each case.

Actual Application of Methods

Up to this point the discussion throughout the present and preceding articles has dealt in a general way with the differences in the problem of management between large and small companies. Particular attention has been given to procedure in the management of small plants. There is no one method of development, control and management for all businesses. Each company has its individual problems which can be solved only by methods which fit its requirements. The fundamental basis of procedure may be the same but details must be varied to suit each particular case. It is well to bear this fact in mind when attempting to refine one's business. Wholesale adoption of any system, without suitable adaptation, is practically useless.

The company of which the writer is manager has not yet installed all the procedure discussed in these articles. Further refinements are necessary and are under way in line with the genral principles outlined. It may be of interest to describe some of the methods already in use, to point out the practical application which one plant has made of these principles.

The first step taken to reorganize management methods was to change the accounting system so that the books would be simple to keep, yet would give necessary information on financial production and sales operations. An accountant was brought in and the problem explained. After a careful study he recommended the following procedure, which was adopted.

Three main ledgers were opened—an operating ledger, a production ledger, and a general ledger. These ledgers carry the data listed below:

Operating Ledger

1—All items which enter into the cost of the goods. These cover material, labor and burdens.

2—Gross sales, with allowances and returns.

3—Cash discounts on sales.

4—Sales expense; including salaries of sales office, salaries of salesmen, traveling expenses, commission, advertising, shipping, telephone and telegraph, etc.

5—Administration expense; including salaries of officers, office force, travel and entertainment, telephone and telegraph, etc.

6—Deductions from income; including interest on payables, federal taxes, and similar items.

7—Additions to income; such as interest on notes receivable, also interest on bank balance, discounts on purchases, etc.

The monthly balances from the operating ledger show the profit or loss for the month and the total to date.

Production Ledger

1—Value of raw material in the plant.

2—Value of goods in process.

3—Value of finished goods in the plant and on consignment.

4—Value of all supplies, etc.

This ledger also carried all department charges, such as supplies, supervision, repairs, wages, and proportional overhead, such as heat, light, maintenance, depreciation.

General Ledger

Contains all control accounts that bear on every phase of the business. Such accounts are:

1—Cash.

2—Accounts receivable.

3—Accounts payable.

4—Control of operating ledger.

5—Control of production ledger.

6—Capital stock.

7—Plant and equipment, etc.

Of course, the items which are entered in these ledgers come from vouchers, books and records which show the details and can be referred to if it is desired to check or investigate any special entry.

Original Records Used

These original records are the stores issue slips for the removal of raw material from stock, employees' time slips, original bills in voucher form covering purchases of materials and supplies, and similar data. Such slips are employed as a part of the permanent record system to cut down the clerical work otherwise required for transcribing, and so that one record will answer all purposes, if possible.

From the general ledger and such original books and records, it is an easy matter quickly to draw off in detail any information required for some special financial or cost investigation.

The next problem faced by the plant was the establishment of a cost system, which also meant one of stock control. Again outside help was secured, this time a management engineer of the Taylor school. He took charge of the work in an advisory capacity. The detailed study of methods in use at the time, and the introduction of changes recommended were made by one of our own men, who discussed each phase of the problem with the manager before making any changes. In this way the principles of the Taylor System were incorporated into methods which met the needs of the company. Nevertheless, much was adopted in the way of records, forms and procedure which later was found to be unnecessary. Gradually the whole method of costing and stock control was refined to a simple form, though Taylor principles were adhered to.

It would be of small benefit to describe the costing and stock control system and its development, for the methods required would differ for each company. The essential thing in introducing such a system is that the work of installing be done by the company's own employees, but under the guidance of men of experience in such fields. This procedure accomplishes two purposes—it insured the adaptation of methods to the particular needs of the plant, and it familiarizes men with the work who have to maintain the system.

The next step in reorganization was the development of a system of production control. Again Taylor's methods were adopted. A system was established embodying his principles. It was soon found that such a system, with all of its details, was too costly and cumbersome for the size of the plant and the extent of manufacturing operations. Many of the forms and specific procedures were therefore eventually discarded. For these was substituted a simple chart, or report, from which production is now planned.

Among the first things brought out by the study of production problems were the waste motion and loss of production caused by the existing arrangement of the machinery in the plant. A new layout was drafted and the machines were so placed that the operator could look after two machines instead of one, as formerly, with no increase in effort. This rearrangement of manufacturing equipment has also made it possible to supply machines with material at a considerable saving in labor and handling, and has brought about other refinements never before possible.

The net result is that one man can now, without additional effort, produce over 100 per cent more product than before the machines were rearranged. The rate of pay has been increased, of course, but the unit cost of production has been lowered to almost half of its former figure.

Besides the rearrangement of machinery the study of production methods led to many other economies throughout the plant, due to better supervision and an actual knowledge of performance.

(To be concluded.)

American Wire Cloth Co. Formed

The American Wire Cloth Company, capital, $25,000, is establishing itself in one of the buildings of the Hill-Curtis Company, North Pitcher street, Kalamazoo, Mich., and will engage in the manufacture of Fourdrinier wires and other paper mill equipment. Frank F. Schmeige is president, with George Shinners, secretary-treasurer, and Lydia A. Shinners, vice president.

Mr. Shinners and Mr. Schmeige are both wire cloth makers of broad experience. The former was 25½ years with the Appleton Wire Works, Appleton, Wis.; Mr. Schmeige worked 22 years for the same company. The concern is now installing its first loom, which is 168 inches wide and built along the most approved lines. It embodies many refinements and conveniences as yet not generally known to wire cloth makers. These were worked out by Mr. Schmeige, who is an expert in his chosen field. These improvements are covered by patents.

The present plant has room for two, possibly three looms, and a wire stretching table. In addition to an option on the building occupied, the American Wire Cloth Company has also been given option of land to the west and north, which if occasion demands, can be acquired for a 30 to 40 loom mill.

Imports of Paper and Paper Stock

NEW YORK, BOSTON, PHILADELPHIA AND OTHER PORTS

NEW YORK IMPORTS

WEEK ENDING FEBRUARY 26, 1927

SUMMARY

Cigarette paper .....5 cs.
Wall paper .....51 bls., 7 cs.
Paper hangings .....6 crates, 62 bls., 57 cs.
Painted paper .....55 cs.
News print .....4,294 rolls
Printing paper .....6 bls., 172 cs.
Wrapping paper .....114 rolls, 705 bls.
Packing paper .....41 cs.
Stencil paper .....1 can, 57 cs.
Typon paper .....2 cs.
Baryta coated paper .....56 cs.
Basic paper .....26 cs.
Surface coated paper .....87 cs.
Decalcomania paper .....2 cs.
Tissue paper .....41 cs.
Colored paper .....1 cs.
Filter paper .....142 bls., 129 cs.
Cover paper .....5 cs.
Drawing paper .....4 cs.
Sulphate paper .....407 rolls
Straw pulp board .....87 rolls
Straw board .....800 pkgs., 459 rolls
Miscellaneous paper...1,992 rolls, 299 bls., 199 cs.

CIGARETTE PAPER

British American Tobacco Co., Alaunia, Liverpool, 5 cs.

WALL PAPER

Keller Dorian Paper Co., Aquitania, Southampton, 3 cs.
F. J. Emmerich, A. Ballin, Hamburg, 4 bls.
F. J. Emmerich, Alaunia, Liverpool, 15 bls.
F. J. Emmerich, Minnewaska, London, 4 cs., 32 bls.

PAPER HANGINGS

Whiting & Patterson Co., Inc., Aquitania, Southampton, 6 crates, 1 cs.
A. C. Dodman, Jr., Inc., Alaunia, Liverpool, 13 bls., 23 cs.
W. H. S. Lloyd & Co., Minnewaska, London, 49 bls., 33 cs.

PAINTED PAPER

Hensel, Bruckman & Lorbacher, Paris, Havre, 55 cs.

NEWS PRINT

Parsons & Whittemore, Inc., Republic, Bremen, 911 rolls.
Parsons & Whittemore, Inc., Casper, Raumo, 210 rolls.
M. Gottesman & Co., Inc., Stockholm, Gothenburg, 253 rolls.
H. Reeve Angel & Co., Inc., Stockholm, Gothenburg, 14 rolls.
The Star Co., Malmen, Hallstavik, 2,906 rolls.

PRINTING PAPER

C. Steiner, N. Amsterdam, Rotterdam, 53 cs.
E. Dietzgen & Co., A. Ballin, Hamburg, 18 cs.
P. C. Zuhlke, Maine, Antwerp, 101 cs.
E. Walker, M. Washington, Trieste, 6 bls.

WRAPPING PAPER

Globe Shipping Co., Maine, London, 705 bls.
G. W. Millar & Co., Inc., Stockholm, Gothenburg, 66 rolls.
Arkell Safty Bag Co., Stockholm, Gothenburg, 48 rolls.

PACKING PAPER

International Forwarding Co., A. Ballin, Hamburg, 31 cs.
Hsule Wax Paper Manfg. Co., A. Ballin, Hamburg, 10 cs.

STENCIL PAPER

Roneo, N. Y., American Shipper, London, 1 can.
Arlac Dry Stencil Co., A. Ballin, Hamburg, 53 cs.
Happel & MacAvoy, A. Ballin, Hamburg, 4 cs.

TYPON PAPER

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BARYTA COATED PAPER

Globe Shipping Co., Republic, Bremen, 56 cs.

BASIC PAPER

Globe Shipping Co., Republic, Bremen, 26 cs.

SURFACE COATED PAPER

Whiting & Patterson Co., Inc., A. Ballin, Hamburg, 3 cs.
P. C. Zuhlke, Maine, London, 50 cs.
Gevaert Co. of America, Maine, London, 34 cs.

DECALCOMANIA PAPER

C. W. Sellers, Republic, Bremen, 2 cs.

TISSUE PAPER

J. M. MacDonald Co., Takaoka Maru, Hong Kong, 3 cs.
Cameo Twine & Paper Co., Takaoka Maru, Hong Kong, 5 cs.
F. C. Strype, Alaunia, Liverpool, 26 cs.
W. J. Byrnes, Alaunia, Liverpool, 7 cs.

COLORED PAPER

P. H. Petry & Co., A. Ballin, Hamburg, 1 cs.

FILTER PAPER

G. Lueders & Co., Alaska, Bordeaux, 20 cs.
E. Fougera & Co., Alaska, Bordeaux, 46 cs.
H. Reeve Angel & Co., Aquitania, Southampton, 1 cs., 3 bls.
J. Manheimer, Aquitania, Southampton, 1 cs., 130 bls.
E. Fougera & Co., Aquitania, Southampton, 8 bls., 52 cs.
H. Reeve Angel & Co., Inc., Minnewaska, London, 9 cs.

COVER PAPER

International Forwarding Co., A. Ballin, Hamburg, 5 cs.

DRAWING PAPER

H. Reeve Angel & Co., Inc., Minnewaska, London, 4 cs.

SULPHATE PAPER

Insight Paper Co., Bergensfjord, Frederickstad, 407 rolls.

STRAW PULP BOARD

J. P. Heffernan Paper Co., N. Amsterdam, Rotterdam, 87 rolls.

STRAW BOARD

Perkins, Goodwin & Co., N. Amsterdam, Rotterdam, 87 rolls.
A. B. Massa Paper Corp., N. Amsterdam, Rotterdam, 800 pkgs.
A. Vuyk, N. Amsterdam, Rotterdam, 372 rolls.

MISCELLANEOUS PAPER

Steiner Paper Corp., N. Amsterdam, Rotterdam, 67 cs.
Wilkinson Bros. & Co., Inc., N. Amsterdam, Rotterdam, 65 bls.
F. C. Strype, N. Amsterdam, Rotterdam, 26 cs.
Keuffel & Esser Co., N. Amsterdam, Rotterdam, 2 cs.
Arkell Safty Bag Co., Republic, Bremen, 57 rolls.
Japan Paper Co., Colombo, Genoa, 18 cs.
Japan Paper Co., Alaska, Bordeaux, 5 cs.
S. Stern, Paris, Havre, 6 cs.
G. A. Vedovie & Co., C. Rosso, Genoa, 4 cs.
C. K. MacAlpine & Co., Stockholm, Gothenburg, 234 bls., 126 rolls.
The Borregaard Co., Inc., Stockholm, Gothenburg, 1,797 rolls.
Haas Bros., Stockholm, Gothenburg, 12 rolls.
H. Reeve Angel & Co., Inc., Stockholm, Gothenburg, 6 cs.
E. H. Sergeant & Co., Stockholm, Gothenburg, 3 cs.
Perry, Ryer & Co., Letitia, Glasgow, 59 cs.
F. L. Kramer & Co., Minnewaska, London, 3 cs.

RAGS, BAGGINGS, ETC.

Union National Bank, Sinsinawa, Constantinople, 224 bls. rags.
Amsinck, Sonne & Co., Inc., Sinsinawa, Constantinople, 370 bls. rags.
E. J. Keller Co., Inc., Passat, Copenhagen, 167 bls. rags.
W. Schall & Co., Incemore, Leith, 45 bls. bagging.
C. R. Spence & Co., Incemore, Leith, 105 bls. rags.
E. J. Keller Co., Inc., Incemore, Leith, 58 bls. rags.
M. Snedeker Corp., Incemore, Belfast, 61 bls. rags.
E. A. Stone & Co., Inc., Republic, Bremen, 36 bls. rags.
F. Stern, Republic, Bremen, 28 bls. rags.
S. Silberman & Co., Republic, Bremen, 52 bls. rags.
Castle & Overton, Inc., Republic, Bremen, 44 bls. rags.
A. W. Fenton, Inc., Republic, Bremen, 80 bls. rags.
C. B. Richard & Co., Republic, Bremen, 61 bls. rags.
Equitable Trust Co., Republic, Bremen, 16 bls. rags.
Chase National Bank, Republic, Bremen, 84 bls. rags.
L. H. Abenheimer, Takaoka Maru, Kobe, 200 bls. rags.
D. M. Hicks, Inc., Takaoka Maru, Kobe, 80 bls. bagging.
Mutnick Bros., Kerhonkson, Manchester, 13 bls. rags.
I. Cohen Son & Co., Inc., Kerhonkson, Manchester, 24 bls. rags.
E. Butterworth & Co., Inc., Kerhonkson, Belfast, 90 bls. rags.
A. Hurst & Co., Alaska, Havre, 3 bls. rags.
T. D. Downing & Co., Alaska, Havre, 54 bls. rags.
Equitable Trust Co., Alaska, Havre, 256 bls. rags.
Castle & Overton, Inc., Alaska, Havre, 64 bls. rags.
E. J. Keller Co., Inc., Alaska, Havre, 53 bls. rags.
French American Banking Corp., Alaska, Havre, 24 bls. rags.
E. J. Keller Co., Inc., Wytheville, Rotterdam, 91 bls. rags.
Taylor Lockwood Co., Tiradentes, Antwerp, 14 bls. rags.
National City Bank, Fenchurch, Barcelona, 223 bls. rags.
E. J. Keller Co., Inc., A. Ballin, Hamburg, 41 bls. rags.
P. Berlowitz, A. Ballin, Hamburg, 88 bls. rags.
The Barrett Co., A. Ballin, Hamburg, 125 bls. rags.
Castle & Overton, Inc., New Britain, Antwerp, 280 bls. rags.
Darmstadt, Scott & Courtney, New Britain, Antwerp, 87 bls. rags.
E. Burrows, Alaunia, Liverpool, 11 bls. rags.
B. D. Kaplan & Co., Alaunia, Liverpool, 22 bls. rags.
Busch & Greenfield Co., Alaunia, Liverpool, 14 bls. rags.
J. Cohen Sons, Inc., Alaunia, Liverpool, 11 bls. rags.
E. J. Keller Co., Inc., City of Pretoria, Antwerp, 125 bls. flax waste.
E. J. Keller Co., Inc., City of Pretoria, Antwerp, 145 bls. thread waste.
Equitable Trust Co., City of Pretoria, Antwerp, 74 bls. paper pulp.
Gaccione Bros., City of Pretoria, Antwerp, 9 bls. paper pulp.
Royal Manfg. Co., City of Pretoria, Antwerp, 71 bls. thread waste.
B. D. Kaplan, Bolivier, Antwerp, 13 bls. rags.
Castle & Overton, Inc., K. Luckenbach, Japan, 20 bls. rags.
Castle & Overton, Inc., N. Amsterdam, Rotterdam, 124 bls. rags.
Castle & Overton, Inc., N. Amsterdam, Rotterdam, 20 bls. thread waste.
E. J. Keller Co., Inc., Bremen, Bremen, 83 bls. thread waste.
E. J. Keller Co., Inc., Hamburg Maru, Kobe, 150 bls. bagging.
E. J. Keller Co., Inc., Pennsylvanian, Kobe, 100 bls. bagging.
E. J. Keller Co., Inc., Blair, Oran, 307 bls. rags.
E. J. Keller Co., Inc., Kentuckian, Kobe, 130 bls. bagging.
E. J. Keller Co., Inc., Clontarf, Casablanca, 136 bls. rags.
E. J. Keller Co., Inc., Cherca, Oran, 204 bls. rags.
E. J. Keller Co., Inc., Cherca, Oran, 165 bls. bagging.

OLD ROPE

H. J. Reed, Republic, Bremen, 132 bls.
E. J. Keller Co., Inc., Republic, Bremen, 78 bls.
G. W. Millar Co., City of Pretoria, Hull, 60 coils.
International Purchasing Co., Cabo Torres, Coruna, 53 coils.
Brown Bros. & Co., Boston City, Bristol, 77 coils.

MANILA ROPE

Brown Bros. & Co., Passat, Hamburg, 55 coils.
Brown Bros. & Co., Maine, Antwerp, 55 bls.
New York Cordage Co., Maine, Antwerp, 23 coils.
Disbrow Cordage Co., Wytheville, Rotterdam, 108 coils.
The Burrabel Co., Alaunia, Liverpool, 20 pkgs.
Brown Bros. & Co., Bolivier, Antwerp, 66 bls.
Ellermans' Wilson Line, Minnewaska, London, 79 coils.

SUNN ROPE

New York Cordage Co., Maine, Antwerp, 31 coils.

CASEIN

Guaranty Trust Co., Troubadour, Buenos Aires, 417 bags, 25,020 kilos.

WOOD PULP

Buck, Kiaer & Co., Inc., Bergensfjord, Oslo, 1,000 bls. kraft pulp.
Buck, Kiaer & Co., Inc., Bergensfjord, Trondhjem, 1,200 bls. sulphite.
Buck, Kiaer & Co., Inc., Hamburg, Halmstad, 800 bls. sulphite, 100 tons.
J. Anderson & Co., Republic, Bremen, 75 bls. wood pulp, 15 tons.
Bulkley, Dunton & Co., Republic, ——, 2,625 bls. wood pulp, 525 tons.
Bulkley, Dunton & Co., Milos, ——, 10,275 bls. sulphite, 2,075 tons.
Bulkley, Dunton & Co., Milos, ——, 6,265 bls. sulphate, 1,253 tons.
Johanson, Wales & Sparre, Inc., Casper, Hernosand, 300 bls. sulphite, 50 tons.

(Continued on page 66)

TISSUE PAPERS

BASE 24 x 36—480 10 to 20 lb.

NO. 1 ANTI-TARNISH KRAFT
NO. 1 AND NO. 2 WHITE TISSUE
NO. 1 AND NO. 2 MANILA TISSUE
LIGHT BLUE AND PINK TISSUE

Jumbo—Machine—Hand Rolls in all sizes

Toilet Paper—Rolls and Sheets.

FLAT **NAPKINS** FOLDED
PLAIN AND CREPED

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110 East 42nd Street New York

For Greater Economy
Without Sacrificing Quality

Use
ALPHA
FIBRE

Our new product—
which takes the place of
rags in paper-making

Inquiries from the trade are welcomed

BROWN COMPANY
founded 1852
PORTLAND, MAINE

PAPER mills have successfully used Oakite for various cleaning operations for more than 10 years.

And it has been definitely proved by these years of continuous use that Oakite *does* save time, money and effort in washing felts and sieve cloths, rags for paper stock, in cleaning Fourdrinier wires, dandy rolls, screens and screen plates, pipes, mixers, and other paper mill equipment.

It is easy to prove this to your satisfaction. Simply call in the Oakite Service Man in your locality (a post card will bring him), and go over your cleaning problems with him; get his suggestions as to how you can do YOUR cleaning BETTER, QUICKER, or at LOWER COST. Or, write for interesting information and formulas on the uses of Oakite in paper mills. No obligation, of course.

OAKITE IS MANUFACTURED ONLY BY

OAKITE PRODUCTS, INC., 48A Thames St., New York
(Formerly OAKLEY CHEMICAL CO.)

Oakite Service Men, cleaning specialists, are located at

Albany, Allentown, Pa., Altoona, Pa., *Atlanta, Ga., Baltimore, *Birmingham, Ala., *Boston, Bridgeport, *Brooklyn, Buffalo, Camden, Charlotte, N. C., *Chicago, *Cincinnati, *Cleveland, *Columbus, O., *Dallas, *Davenport, *Dayton, *Denver, *Des Moines, *Detroit, Erie, Pa., Flint, Mich., Fresno, Cal., *Grand Rapids, Harrisburg, Hartford, *Indianapolis, *Jacksonville, Fla., *Kansas City, *Los Angeles, Louisville, Ky., *Milwaukee, *Minneapolis, *Montreal, Newark, Newburgh, N. Y., New Haven, *New York, *Oakland, Cal., *Omaha, Neb., Philadelphia, *Pittsburgh, Portland, Me., *Portland, Ore., Providence, Reading, *Rochester, Rockford, Rock Island, *San Francisco, *Seattle, *St. Louis, South Bend, Ind., Springfield, Ill., Syracuse, *Toledo, *Toronto, *Tulsa, Okla., Utica, *Vancouver, B. C., Williamsport, Pa., Worcester.

*Stocks of Oakite materials are carried in these cities.

OAKITE
TRADE MARK REG. U.S. PAT. OFF.
Industrial Cleaning Materials and Methods

Imports of Paper and Paper Stock

(*Continued from page 64*)

Johanson, Wales & Sparre, Inc., A. Ballin, Hamburg, 165 bls. wood pulp, 28 tons.
Castle & Overton, Inc., Wytheville, Rotterdam, 360 bls. wood pulp, 56 tons.
Johanson, Wales & Sparre, Inc., Stockholm, Gothenburg, 500 bls. wood pulp.
Buck, Kiaer & Co., Stockholm, Gothenburg, 125 bls. sulphite.
Johanson, Wales & Sparre, Inc., Stockholm, Gothenburg, 350 bls. sulphite.
Johanson, Wales & Sparre, Inc., Stockholm, Gothenburg, 299 bls. dry soda pulp.
E. M. Sergeant & Co., Stockholm, Gothenburg, 299 bls. dry soda pulp.
Continental Paper Co., Stockholm, Gothenburg, 140 bls. wood pulp.
Price & Pierce, Ltd., Stockholm, Gothenburg, 650 bls. wet pulp.
M. Gottesman & Co., Inc., M. Washington, Trieste, 3,294 bls. wood pulp.
D. M. Hicks, Inc., M. Washington, Trieste, 490 bls. wood pulp.
Price & Pierce, Ltd., Malmen, Hallstavik, 1,575 bls. wood pulp, 315 tons.
E. J. Keller Co., Inc., Bremen, Bremen, 400 bls. wood pulp.
E. J. Keller Co., Inc., Berlin, Bremen, 323 bls. wood pulp.

PULP BOARDS

Steffens Jones Co., Stockholm, Gothenburg, 44 bls.

BOSTON IMPORTS

WEEK ENDING FEBRUARY 26, 1927

Brown Bros. & Co., City of Pretoria, Hull, 203 bls. old rope, 213 coils.
Castle & Overton, Inc., City of Pretoria, Antwerp, 204 bls. rags.
Chemical National Bank, Tiradentes, Antwerp, 314 bls. rags.
J. Spaulding Fibre Co., Tiradentes, Antwerp, 275 bls. flax waste.
2nd National Bank of Boston, Tiradentes, Antwerp, 278 bls. rags.
1st National Bank of Boston, Tiradentes, Antwerp, 149 bls. flax waste.
Buck, Kiaer & Co., Inc., Frode, Trondhjem, 1,200 bls. sulphite pulp.
Buck, Kiaer & Co., Inc., Frode, Oslo, 600 bls. kraft pulp.
Buck, Kiaer & Co., Inc., Frode, Oslo, 3,400 bls. sulphite pulp.
Robert Blank, J. Skinner, Hamburg, 131 bls. rags.
E. J. Keller Co., Inc., J. Skinner, Hamburg, 57 bls. wipers.
E. J. Keller Co., Inc., J. Skinner, Hamburg, 543 bls. rags.
E. J. Keller Co., Inc., Ala, Rotterdam, 89 bls. rags.
E. J. Keller Co., Inc., Seattle Spirit, Hamburg, 94 bls. rags.
E. J. Keller Co., Inc., P. Luckenbach, Shanghai, 500 bls. rags.
Castle & Overton, Inc., Barbadian, England, 134 bls. rags.
Castle & Overton, Inc., ——, Germany, 105 bls. rags.

PORTLAND, ME., IMPORTS

WEEK ENDING FEBRUARY 26, 1927

Pagel, Horton & Co., Inc., Malmen, Gefle, 2,500 bls. sulphite pulp.
The Borregaard Co., Inc., Malmen, Gothenburg, 7,625 bls. wood pulp.

PHILADELPHIA IMPORTS

WEEK ENDING FEBRUARY 26, 1927

W. Schall & Co., Cherca, Genoa, 215 bls. rope.
E. H. Bailey & Co., Incemore, Leith, 110 cs. paper.
A. W. Fenton, Inc., Incemore, Leith, 126 bls. rags.
J. A. Steer & Co., Incemore, Leith, 85 bls. old rope.
Johanson, Wales & Sparre, Inc., Casper, Hernosand, 1,200 bls. sulphite pulp, 203 tons.
Johanson, Wales & Sparre, Inc., Casper, Hernosand, 2,700 bls. sulphate pulp, 457 tons.
Pagel, Horton & Co., Inc., Casper, Hornefors, 2,952 bls. sulphite pulp, 409 tons.
Buck, Kiaer & Co., Inc., Casper, Holmsund, 3,500 bls. kraft pulp, 508 tons.
Johnson Paper Co., Casper, Kotka, 107 bls. news print.
Paper House of Pa., Casper, Kotka, 146 bls. news print.
Philadelphia Girard National Bank, Alaska, Havre, 234 bls. rags.
Equitable Trust Co., Alaska, Havre, 645 bls. rags.
State Bank, Alaska, Havre, 149 bls. rags.
A. Hurst & Co., Alaska, Havre, 133 bls. rags.
W. Schall & Co., Alaska, Havre, 95 bls. rags.
National City Bank, Alaska, Havre, 95 bls. rags.
L. H. Abenheimer, Alaska, Havre, 136 bls. rags.
Castle & Overton, Inc., Alaska, Havre, 143 bls. rags.
Phila. Girard Natl. Bank, Alaska, Dunkirk, 160 bls. rags.
Chase National Bank, Alaska, Dunkirk, 67 bls. rags.
W. Schall & Co., Alaska, Dunkirk, 149 bls. rags.
Fidelity Trust Co., Alaska, Bordeaux, 637 bls. rags.
National Bank of Commerce, Alaska, Havre, 142 bls. rags.
Bulkley, Dunton & Co., Wytheville, ——, 105 bls. rags.
Castle & Overton, Inc., Wytheville, Rotterdam, 34 bls. rags.
Castle & Overton, Inc., Wytheville, Rotterdam, 180 bls. wood pulp, 28 tons.
Robert Blank, Wytheville, Rotterdam, 104 bls. rags.
D. I. Murphy, Wytheville, Rotterdam, 24 bls. rags.
E. J. Keller Co., Inc., Wytheville, Rotterdam, 282 bls. rags.
E. J. Keller Co., Inc., New Britain, Antwerp, 106 bls. bagging.
MacBlaine & Co., New Britain, 24 bls. rags.
M. Friedman, New Britain, Antwerp, 49 bls. rags.
D. I. Murphy, New Britain, Antwerp, 224 bls. rags.
Fidelity Trust Co., New Britain, Antwerp, 92 bls. rags.
Phila. Girard Natl. Bank, New Britain, Antwerp, 98 bls. rags.
Castle & Overton, Inc., New Britain, Antwerp, 96 bls. waste paper.
Castle & Overton, Inc., New Britain, Antwerp, 283 bls. rags.
Old Colony Trust Co., New Britain, Antwerp, 64 coils old rope.
D. L. Ward & Co., New Britain, Antwerp, 4 bls. wrapping paper.
S. S. Alcorn, New Britain, Antwerp, 38 bls. wrapping paper.
Price & Pierce, Ltd., Malmen, Gothenburg, 3,000 bls. wood pulp.
E. M. Sergeant & Co., Malmen, Gothenburg, 748 bls. dry soda pulp.
Parsons & Whittemore, Inc., Malmen, Gothenburg, 300 bls. sulphite pulp.
S. S. Alcorn, Malmen, Gothenburg, 236 rolls wrapping paper.
Castle & Overton, Inc., ——, Germany, 600 bls. wood pulp.
Castle & Overton, Inc., J. Skinner, Germany, 50 bls. rags.
Castle & Overton, Inc., Hannover, Germany, 39 bls. rags.
Castle & Overton, Inc., Blyadendyk, Holland, 14 bls. rags.
Castle & Overton, Inc., Sarcoxie, France, 810 bls. rags.
E. J. Keller Co., Inc., Hamburg Maru, Kobe, 120 bls. rags.
E. J. Keller Co., Inc., Willsolo, Kobe, 310 bls. rags.
E. J. Keller Co., Inc., Stadsdyk, Karlsruhe, 300 bls. wood pulp.
E. J. Keller Co., Inc., Stadsdyk, Rotterdam, 137 bls. rope.
E. J. Keller Co., Inc., Manchester Importer, Manchester, 42 bls. bagging.
E. J. Keller Co., Inc., Goettingen, Bremen, 230 bls. rags.
Buck, Kiaer & Co., Inc., Arkansas, Oslo, 203 bls. sulphite pulp.
Buck, Kiaer & Co., Inc., Tampa, Oslo, 400 bls. wood pulp.
Buck, Kiaer & Co., Virginia, Oslo, 1,600 bls. kraft pulp.

BALTIMORE IMPORTS

WEEK ENDING FEBRUARY 26, 1927

Congoleum-Nairn Co., Passat, Hamburg, 968 bls. rags.
E. J. Keller Co., Inc., Passat, Hamburg, 340 bls. wood pulp, 52 tons.
D. M. Hicks, Inc., Passat, Hamburg, 3,500 bls. wood pulp, 756 tons.
National City Bank, Alaska, Havre, 1,266 bls. rags.
Buck, Kiaer & Co., Inc., Hjelmaren, Gothenburg, 350 bls. sulphite pulp.
E. J. Keller Co., Inc., Stadsdyk, Karlsruhe, 600 bls. wood pulp.
E. J. Keller Co., Inc., Goettingen, Bremen, 300 bls. wood pulp.
E. J. Keller Co., Inc., West Celina, Hamburg, 100 bls. rag pulp.
E. J. Keller Co., Inc., Westpool, Hamburg, 50 bls. rag pulp.
E. J. Keller Co., Inc., Altmark, Hamburg, 60 bls. rag pulp.
Castle & Overton, Inc., ——, Germany, 1,835 bls. wood pulp.

NEW ORLEANS IMPORTS

WEEK ENDING FEBRUARY 26, 1927

Castle & Overton, Inc., Effna, Germany, 236 bls. rags.
Castle & Overton, Inc., Gand, France, 159 bls. rags.
E. J. Keller Co., Inc., Port Lobos, Kobe, 120 bls. rags.
E. J. Keller Co., Inc., E. Luckenbach, Kobe, 120 bls. rags.

NORFOLK IMPORTS

WEEK ENDING FEBRUARY 26, 1927

Johanson, Wales & Sparre, Inc., Casper, Hernosand, 450 bls. sulphate pulp, 76 tons.
Johanson, Wales & Sparre, Inc., Casper, Hernosand, 300 bls. sulphite pulp, 50 tons.
Buck, Kiaer & Co., Inc., Goettingen, Trondhjem, 180 bls. sulphite pulp.

News of the Boston Trade

BOSTON, Mass., February 28, 1927.—In the paper stock market there is more or less variation in prices. While white blank news is quoted by some at $1.50 to $1.60, others are naming $1.55 to $1.65. Likewise in heavy books, some are asking $1.10 to $1.20 and others $1.15 to $1.25. No. 1 light books are quoted by some as low as $1.15. Old kraft some value at $2.15 to $2.20 and others at $2.20 to $2.30. Old newspapers have been selling at .62½ to .67½, and have also been quoted at .60 to .70. Dealers report that there is little "pep" to the demand for paper stock.

Charles H. Wood, president of E. Butterworth & Co., Inc., attended the ball in honor of Governor Huntley Spaulding at Concord, N. H., Friday evening, February 25.

R. H. Spaulding, of the Spaulding Fibre Company, North Rochester, N. H., and ex-Governor of New Hampshire, was in the Boston market recently calling on members of the trade.

John E. A. Hussey, of the International Paper Company, who was at the Deaconess' Hospital for a number of weeks has sufficiently recovered to be at his home in Brookline, Mass.

Those who have visited the Boston paper trade recently include Robert Finley, of the District of Columbia Paper Company, who was guest of his father, Albert W. Finley; Louis Roger, of the Roger Fibre Company, Bar Mills, Kennebunk, and Empire Road, Me.; David Galloway, of the David Galloway Company, Inc., N. Y.; Joseph Gatti, of the Joseph Gatti Company.

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Centrifugal Pumps

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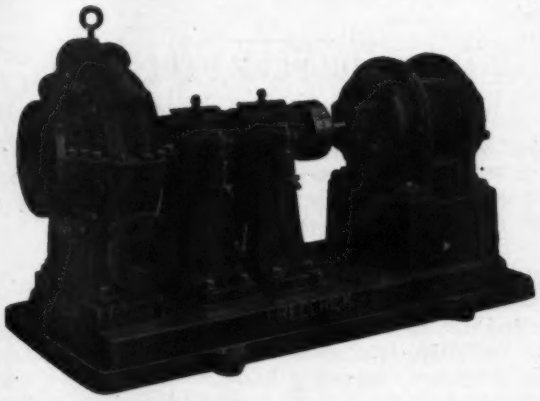

Until the advent of Frederick Paper-Mill Pumps, designed specifically for handling stocks of high consistencies, paper-mills were dependent upon the old type fan pumps to move their stock. These pumps moved it—but at a power consumption that was excessive. Today they are rapidly being replaced, except where it is necessary to handle stock containing strings, rags, clips, etc. Frederick Stock Pumps, which caused this change, still hold the position of leadership in paper-mill service which they thereby won. Moreover, the ever-growing demand for more Frederick Pumps from the hosts of paper-mills that are already using them, indicates that this position is being very well consolidated.

Our Standard Stock Pump handles stocks of consistencies up to 4% with excellent efficiency. Our Super-Stock Pump will efficiently handle 6% stock.

There is a Type of Frederick Pump Suitable to Every Need of a Paper-Mill

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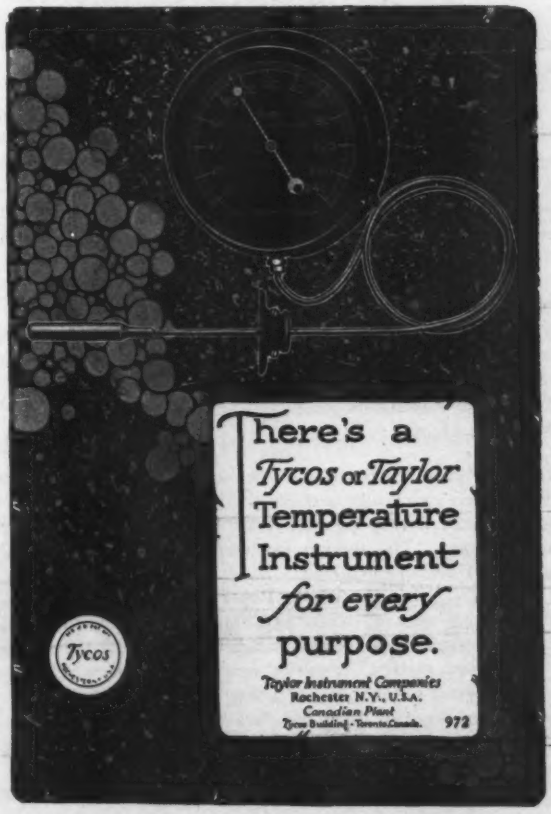
Woolen manufacturers since 1856



New York Market Review

Office of THE PAPER TRADE JOURNAL,
Wednesday, March 2, 1927.

Trading in the local paper market continued along routine lines during the past week. A fairly satisfactory demand was experienced for the different grades of paper. Greater activity is anticipated from now on, as the spring campaign will shortly be in full swing. Prices are reported to be generally steady, and the schedule is being maintained, in most instances.

The news print market is still in a strong position. Production, both in Canada and the United States, is proceeding at a rapid rate, and consumption continues to expand. While the spot demand is rather light, prices remain firm, and the future outlook for the industry is full of promise.

Demand for the various grades of paper board is fairly persistent, and quotations are holding up very well. Some improvement has been experienced in the fine paper market, and a good volume of orders are being received from the printers. The tone of the coarse paper market is strong, and wrapping paper is in steady request.

Mechanical Pulp

Little change has been recorded in the ground wood market. The output of domestic ground wood has been affected to some extent by recent weather conditions but accumulations appear to be sufficient to take care of current requirements. Scandinavian ground wood is in excellent request. No radical price changes have been reported of late.

Chemical Pulp

The chemical pulp market was fairly active during the past week. Both domestic and foreign chemical pulp are in excellent request for the time of the year, while prices are well maintained, shading being infrequent. Although it is believed that the paper and board mills have mostly covered their immediate requirements, a satisfactory volume of inquiries are being received on account of future business.

Old Rope and Bagging

The paper mills are said to be taking a greater interest in old rope and bagging, and an improved market is confidently anticipated in the near future. Supplies are just about sufficient to cover immediate demands, and are moving into consumption at a fairly satisfactory rate. No price changes have been recorded lately.

Rags

Domestic rags are reported to be in somewhat better request, and prices are practically unchanged. A fair amount of business was transacted during the past week in the lower and medium grades of rags. The foreign rag market continues rather lifeless. Prices remain unaltered.

Waste Paper

The lower grades of waste paper are in fairly good request, while some slight improvement has been noticed in the demand for the higher grades. Inquiries for future business are being received in good volume, and a livelier market is anticipated very shortly. No. 1 mixed paper has declined slightly, but the prices on all other grades remain unchanged.

Twine

Influenced by the improved demand for wrapping paper for spring and Easter requirements, the twine market is exhibiting a stronger tendency, and prices are holding up to formerly quoted levels in a satisfactory manner. Observers of the twine market predict a strong trend for the industry during the next few weeks.

BUYS DE PERE PAPER MILL

(*Continued from page 27*)

being operated at the present time, with enough orders booked to keep the mill going for some time. Three shifts are employed and the remaining machinery will soon be moving so that the plant will be operating at capacity.

New Paper Coating Machine

Herman G. Weber of Appleton has been awarded a patent on a paper coating machine. He has assigned one-half interest in the device to the American Lakes Paper Company of Chicago, Ill. Mr. Weber is a mechanical engineer with the Thilmany Pulp and Paper Company of Kaukauna, Wis., and for several years has been in charge of the company's bag mill at Waukegan, Ill.

May Extend Pulp and Paper Courses

Extension of pulp and paper education to other cities of Wisconsin outside the Fox River Valley was discussed at a conference at Appleton, Wis., of directors of Vocational schools. E. E. Gunn, Jr., assistant state director of vocational education, was present and reviewed the possibilities along this line. A complete survey will be made to prepare for this new program, so that all cities having pulp and paper mills will have the advantages now afforded workers who attend night schools in various parts of the valley.

Foremen's Safety School

Enrollment in the foremen's safety schools being conducted in Appleton and Green Bay, Wis., has reached 250, with paper mill factory executives in the majority, according to a checkup at the weekly sessions this last week. Considerable interest is shown in the subject, especially because of the prominence of the speakers who are making the addresses.

Among those who have talked to the foremen are Judson G. Rosebush, president of the Patten Paper Company, Appleton, and the Northern Paper Mills, Green Bay; W. J. Peacock, head of the personnel department of the Northern mills; Dr. Ernest W. Miller of the Milwaukee Electric Railway and Light Company; R. A. McKeown, engineer of the Wisconsin Industrial Commission; George Maye, bleaching engineer of the Hooker Electro Chemical Company of Niagara Falls, N. Y., and others.

German Paper Market Improves

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., March 1, 1927.—Improvement is reported in the situation in the west German paper market in the past few weeks, according to a report to the Department of Commerce from Trade Commissioner Dougherty, at Berlin, who ascribes the revival in business in the paper consuming industries together with the need for replenishment of stocks exhausted at Christmas time as reasons for the increased demand.

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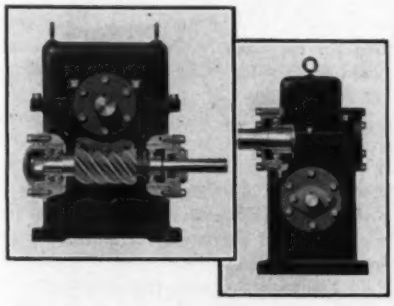

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Our Worm Gear Speed Reducers represent the most advanced engineering and the highest type of precision manufacture. You will find them in use in many basic industries in this country.

Write for Bulletin 251—of interest to you.

The Horsburgh & Scott Co.

"Gear Makers since '89"

5112 Hamilton Ave. CLEVELAND, U.S.A.

Miscellaneous Markets

Office of THE PAPER TRADE JOURNAL,
Wednesday, March 2, 1927.

During the past week there was an excellent demand for paper makers' chemicals and the local market was very steady. A satisfactory volume of inquiries for future requirements were also reported by the manufacturers. Contract shipments have been moving at a good pace, while spot sales have been more numerous than for some time. Prices are generally holding well up to schedule.

BLANC FIXE—Conditions in the blanc fixe market are steady, and prices are unchanged. Contract withdrawals are proceeding in a normal manner. The pulp is still quoted at $60 per ton, in bulk, and the powder is offered at from 4 cents to 4¼ cents a pound, in barrels, at works.

BLEACHING POWDER.—Steadiness continues to prevail in the bleaching powder market, and production is not in excess of requirements. Shipments against contract are moving in routine manner. Quotations remain unaltered. Bleaching powder is selling at from $2 to $2.40 per 100 pounds, in large drums, at works, according to quantity and grade.

CASEIN.—Offerings of casein at the present time are rather limited and prices are unsettled. An improvement in the market is expected by many observers in the course of the next few weeks. The quotation for imported casein ranges from 16½ cents to 17 cents a pound, while domestic casein is selling at from 16 cents to 17½ cents a pound, all in bags, car lot quantities.

CAUSTIC SODA—Demand for caustic soda is persistent, and consumption is being well maintained. Contract shipments continue to go forward in large volume. The spot market is fairly active and prices are firm. Caustic soda is quoted at from $3 to $3.10 per 100 pounds, in large drums, at works. Spot car lots are offered at $3.20 per 100 pounds.

CHINA CLAY.—Trading in the china clay market was rather slow during the past week, but contract shipments continued to move at a regular pace. Domestic washed clay is still quoted at from $8 to $9 a ton, at mine, and pulverized at $10 a ton. Imported china clay is offered at from $15 to $25 a ton, in bulk, ship side.

CHLORINE.—Manufacturers of chlorine continue to report excellent withdrawals on contract. Demand for chlorine is being well maintained, and prices rule very firm. The quotation on chlorine is still 4 cents a pound, in tanks ,or multi-unit cars, at works, an contract orders. The spot price rules from 4¼ cents to 4½ cents per pound.

ROSIN.—The demand for rosin during the past week was light, and the market continued to fluctuate. At the naval stores, the grades of gum rosin used in the paper mills are now offered a from $11.60 to $12.15 per 280 pounds, ex dock, in barrels. Wood rosin prices have declined to $9:50 per 280 pounds, at southern shipping points.

SALT CAKE.—The salt cake market continues to exhibit a steady tone. Contract withdrawals are being well maintained, and prices are holding up very well. The spot demand is about normal for the time of the year. Salt cake continues to sell at from $18 to $20 a ton, in bulk, at works. Chrome salt cake is selling at from $14 to $15 a ton.

SODA ASH.—Contract withdrawals of soda ash are moving at a satisfactory pace and prices are being maintained at the former levels. The position of the industry is very sound, and the tone of the market is steady. Contract quotations, in car lots, at works, are as follows: in bags, $1.32½ , and in barrels, $1.57¾.

STARCH.—No changes have been reported in the starch market of late. Trading conditions along routine lines, and prices are being well maintained. Stocks are reported to be in ample volume for current requirements. Special paper makers' starch is selling at $3.22 per 100 pounds, in bags, and at $3.39 per 100 pounds, in barrels.

SULPHITE OF ALUMINA.—The tone of the sulphate of alumina market is steady, and prices are practically unchanged. Demand for spot supplies is becoming more active. Commercial grades of sulphate of alumina are offered at from $1.40 to $1.45, in bags, at works, in car lots. The iron free is quoted at from $2 to $2.05 per 100 pounds, at works.

SULPHUR.—No changes were recorded in the sulphur market during the past week and quotations remain unaltered from the level which has prevailed for some little time. Shipments continue to move in a normal manner. The quotation on the grades of sulphur used in the paper mills ranges from $18 to $19 a ton, in bulk, at mine.

TALC.—The tone of the talc market continues steady and the schedule of prices is being maintained, shading being infrequent. American talc is quoted at from $16 to $18 a ton, at eastern mines. French talc is still selling at from $18 to $22 a ton, ship side.

TORONTO EXPECTS REVIVAL

(*Continued from page 31*)

tions Department of the Spanish River Pulp and Paper Mills, Sault Ste. Marie, Ont., has resigned and become connected with the International Labor Office at Geneva, where he will remain for a considerable time, after which his duties will bring him to New York City to reside. Mr. Olzendan has been succeeded by D. B. Chant.

J. McArthur has bought the assets of the Canada Waxed Paper Company, Toronto, which recently made an assignment. It is understood that the creditors will receive about twenty cents on the dollar. Mr. McArthur is organizing a new company and the industry on Carlaw avenue, Toronto, is now being continued.

The annual meeting of Canadian Pulp Products, Ltd., was held in Hamilton recently. The concern is operating an egg carrier plant on the premises of Cameron & Fraser, Simcoe street, Toronto. W. M. Cameron, vice president and general manager of the company, reported that good progress had been made in the installation of the plant, which is doing considerable experimental work, but will soon be producing, a new dryer being installed. The company expects a large market for its product. Walter Wood was elected president, W. M. Cameron, vice president and general manager, J. H. Pickett, secretary-treasurer; directors, E. F. Clarke and J. Henderson.

The Canadian Barking Drum Company, Toronto, has recently installed three new drum barkers in the plant of the Fort Frances Pulp and Paper Company, Fort Frances, Ont. The company is also manufacturing for the Lake St. John Pulp and Paper Company, of Quebec, six drums of the U-Bar type, two being 12 x 45 feet, and four, 10 x 30 feet.

T. J. Macabe, president of the Buntin, Reid Company, wholesale paper dealers, Toronto, and Mrs. Macabe, have gone on a trip to Southern California.

The Howard Smith Paper Mills have been showing a two reel film of moving pictures in Toronto during the past few days, before a number of civic and service clubs, illustrating the process of making fine papers.

The Buntin, Reid Company, Toronto, has sent out to the trade an artistically printed folder of imitation art paper of India tint, illustrating different patterns of Oriental rugs. The folders are fine examples of half tone printing, the various colors and combinations of hues being brought out exceptionally clear.

Mutual Paper Co. Incorporates

CLEVELAND, Ohio, February 28, 1927.—The Mutual Paper Company, 414 Sloan Building, has incorporated and will carry a stock of fine papers, specializing on bond papers, cardboards and coated books. The following are the officers of the company: A. L. Trossler, President; J. J. Feicht, Treasurer, and Earl Feicht, Vice President.

The company will also deal in seconds and jobs in Fine Papers maintaining a stock at Prospect avenue and Eighth street.

B QUALITY PULPS

"HAFSLUND BEAR"
Bleached Sulphite

"FORSHAGA"
Bleached Sulphite

"HURUM SPECIAL"
Extra Strong Kraft

NORWAY SPECIAL

"BAMBLE"
Extra Strong Kraft

KOOS BAC

The Borregaard Company
Incorporated
200 FIFTH AVENUE NEW YORK, N. Y.

Clay
300 tons daily
AMERICAN MADE FOR AMERICAN TRADE

Over forty-one years' experience in the clay industry has naturally resulted in the adoption of the most scientific methods and practices.
This record of achievement is your guaranty of Clay of absolute uniformity at prices consistent with M. E. quality and service.
Prices of M-E pulverized clay may surprise you even considering this additional treatment.
Let us submit sample and quote you.

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MINER-EDGAR CO.
110 William St.,
NEW YORK

INTERNATIONAL SALT CRYSTALS

Facts are essential to efficient industrial operation. Particularly valuable are those facts which affect the conduct of processes.

"International" has, naturally, acquired many facts concerning the use of salt which are valuable to industrial users. This knowledge is gladly shared through the cooperation extended by "International" service.

INTERNATIONAL SALT COMPANY, Inc.
475 Fifth Avenue, New York

1864 1927

"EXCELSIOR" FELTS

for every grade of

PULP AND PAPER

We continue to maintain at the top the quality of Excelsior Felts, as we have done since we, as pioneers, made the first endless paper machine felts manufactured in America.

Seamless felts for fast running.
Satin Style felts for finish.
Special felts to meet every condition.
Send us your felt problems.

KNOX WOOLEN COMPANY
CAMDEN, MAINE

SOLD BY
BULKLEY, DUNTON & COMPANY
75-77 Duane St., N. Y., and direct

Market Quotations

Quoted by Hepburn & Co., 74 Broadway, N. Y. City, to whom all inquiry for quotations on these or any other Securities is referred.

BONDS	BID	OFFERED
Advance Bag & Paper, 7s 1943	101	103*
A. P. W. Pulp & Power, 7s 1945	102	106*
American Writing Paper, 6s 1947	79	82
Bastrap Pulp & Paper, 6½s 1940	98	101*
Bedford Pulp & Paper, 6½s 1942	97	100*
British Columbia Pulp & Paper, 6s 1950	80	90*
Beaver Products Corp., 7½s 1942	106	109
Bedford Pulp & Paper, 6½s 1942	95	100
Berkshire Hills Paper, 8s 1941	60	80
Brown Paper Co., 1st 5½s 1946	94	98
Bryant Paper Co., 6s 1942	98	102
Cape Breton Pulp & Paper, 6s 1932	101	103
Central Paper Serial 6, 6½s 1942	89	...
Champion Coated Paper, 6s 1926 to 1932	98	...
Champion Fibre, 8s 1930	100	...
Champion Paper Corp'n, 1st 6s 1945	94	97
Continental Paper Products, 6½s 1943	88	91½
Cornell Wood Prod., 7½s 1937	100	104*
Crown Willamette Paper, 6s 1951	97	101
Donnaconna Paper, 6s 1940	99	102
Dells Paper & Pulp Serial, 6s 1926-38	*95	...
Eastern Mfg. Co., 7s 1938	92	95
Eddy Paper, 7½s 1931	99	102
Escanaba Paper Serial, 6s 1926-39	90	95
Filer Fibre Serial, 7s 1926-39	90	95
Fort Orange Paper, 7s 1942	95	100*
Fox River Paper, 7s 1931	99	...
Gair Co. (The Robt.), 7s 1937	102	105
Gilbert Paper Co., 6½s 1926-29	99	...
Hammermill Paper, 6s 1939	100	103*
Itaska Paper & Prairie River Power, J+5½s 1926-38	94	96*
Itaska Paper 1st, 6s 1933-38	96	98*
Kalamazoo Veg. Parchment, 6s 1938	98	...
Lake Superior Pulp & Paper, 6s 1941	102	105*
Marinette & Menominee, 7½s 1936	101	...
Menasha Printing & Carton, 6½s 1939	99½	...
Mengel Company, 7s 1926 to 1934	100*	102
Miami Paper, 7½s 1931	98	...
Monroe Paper Products, 7½s 1932	96	...
Nekoosa Edwards, 1st Ref. 6s 1928 to 1942	96	99*
Orono Pulp & Paper, 6s 1943	98	...
Orono Pulp & Paper, 5s 1941	94	...
Oswego Falls Corp., 6s 1941	98	100*
Oxford Paper, 6s 1947	100	...
Paepcke Paper Mills, 7s 1930	99	...
Parsons Pulp & Lumber, 7s 1928	97	...
Parker Young Co., 6½s 1944	95	99
Paterson Parchment Paper, 6s 1938	100½	102
Penobscot Chemical Fibre, 6s 1942	98	...
Peshtigo Paper, 7s 1942	50	75
Poland Paper, 7s 1930	98	...
Port Alfred Pulp, 6½s 1943	*96	...
Richardson Co., 6s 1938	97	...
Spanish River Pulp & Paper, 8s 1941	106	110
Stevens & Thompson Paper, 6s 1942	91	94
St. Croix Paper, 5s 1926-37	95	98*
St. Regis Paper Serial, 6½s 1926-35	98½	...
Tait Paper & Color Industries, 6s 1934	90	...
Taggart Bros. Co., 6s 1944	97	100*
Ticonderoga Pulp & Paper, 5s 1930	90	95*
Ticonderoga Pulp & Paper, 6s 1940	98	100*
Warren (The S. D.) Company, 6s 1945	98	101
Wotab Paper, 6½s 1943	99	103
Westfield River Paper, 7s 1926-43	Wanted	...
Whitaker Paper, 7s 1942	103	106
Witmer-Parsons Pulp & Lbr. (Units)	63	70

STOCKS	BID	ASKED
Advance Bag & Paper, 8% Pfd.	97	100*
Brompton Pulp & Paper, 8% Pfd.	93	98*
Brown Corpn., 7% Pfd.	97	100*
Bryant Paper, Com.	11	13
Bryant Paper, Pfd.	9	11
Champion Fibre, 7% Pfd.	99	103*
Consolidated Paper, Common	19	24*
Diem & Wing, 7% Cum. Pfd.	90	93*
Donnaconna Paper, Com.	49	54
Donnaconna Paper, Pfd.	95	100
Eastern Mfg. Co., 1st Pfd.	34	37
Great Northern Paper, Cap.	285	305
Hammermill Paper, 7% Pfd.	105	110
Hinde & Dauch, Com.	135	...
Hinde & Dauch, Pfd.	100	...
Marathon Paper Mills, Com.	125	...
Louis De Jonge Co., 7% Pfd.	93	96
Munissing Paper, Com.	10	15*
New York & Penna. Co.	Wanted	None Off.
Oxford Papers, Com.	102	...
Oxford Paper Co., Pfd.	100	105
Penobscot Chemical Fibre, Com.	65	75*
Richardson Co., 7% Pfd.	103	...
Rubberoid Company	65	75
Seaman Container, Class B (par $1)	1	None Off.
Seaman Paper Co.	Wanted	None Off.
St. Croix Paper	150	170
St. Regis Paper Co., 7% Cum. Pfd.	97	100
Westfield River Paper Co., 1st Pfd.	Wanted	None Off.
West Virginia Pulp and Paper, Com.	58	63
West Virginia Pulp and Paper, Pfd.	97	102
Whittaker Paper, 7% Cum. Pfd.	99	103

* Nominal.

Paper

(F. o. b. Mill)

Ledgers	11.00	@38.00
Bonds	9.00	@45.00
Writings—		
Extra Superfine	14.00	@32.00
Superfine	14.00	@32.00
Tub sized	10.00	@15.00
Engine Sized	8.00	@11.00
News—		
Rolls, contract	3.25	@ —
Rolls, transient	3.25	@ 3.50
Sheets	3.65	@ 3.85
Side Runs	3.00	@ 3.75
Book, Cased—		
S. & S. C.	7.00	@ 9.75
M. F.	6.25	@ 8.75
Coated and Enamel	8.00	@15.00
Lithograph	8.00	@15.00
Tissues—Per Ream—		
White No. 1	.80	@ 1.00
Anti-Tarnish	1.10	@ 1.90
Colored	1.00	@ 2.00
White No. 2	.75	@ .85
Kraft	.90	@ 1.00
Manila	.75	@ .85
Kraft—		
No. 1 Domestic	6.25	@ 6.50
No. 2 Domestic	5.25	@ 5.50
Southern	4.75	@ 5.25
Imported	6.50	@ 7.00
Manila—		
No. 1 Jute	9.00	@ 9.25
No. 2 Jute	7.75	@ 8.50
No. 1 Wood	4.75	@ 5.25
No. 2 Wood	4.00	@ 4.50
Butchers	3.75	@ 4.25
Fibre Papers—		
No. 1 Fibre	5.00	@ 5.50
No. 2 Fibre	4.75	@ 5.25
Common Bogus	2.75	@ 3.00
Screenings	3.00	@ 3.25
Card Middles	4.00	@ 5.00
Boards—per ton—		
News	42.50	@45.00
Straw	57.50	@60.00
Chip	40.00	@42.50
Binders' Boards	65.00	@70.00
Sgl. Mla. Ll. Chip	52.50	@55.00
Wood Pulp	67.50	@72.50
Container	60.00	@65.00
Glassine—		
Bleached, basis 25 lbs.	13.00	@16.00
Bleached, basis 20 lbs.	15.00	@16.00

Mechanical Pulp

(Ex-Dock)

No. 1 Imported—		
Moist	34.00	@36.00
Dry	36.00	@38.00
(F. o. b. Mill)		
No. 1 Domestic	27.00	@30.00
Screenings	15.00	@20.00

Chemical Pulp

(Ex-Dock, Atlantic Ports)

Sulphite (Imported)—		
Bleached	3.75	@ 4.50
Easy Bleaching	3.20	@ 3.35
No. 1 strong unbleached	2.95	@ 3.05
Mitscherlich unbleached	3.00	@ 3.40
No. 2 strong unbleached	2.85	@ 2.90
No. 1 Kraft	2.90	@ 3.05
Sulphate—		
Bleached	3.75	@ 4.00
(F. o. b. Pulp Mill)		
Sulphite (Domestic)—		
Bleached	3.65	@ 4.75
Easy Bleaching Sulphite	3.00	@ 3.25
News Sulphite	2.65	@ 2.85
Mitscherlich	3.25	@ 3.75
Kraft (Domestic)	2.85	@ 3.40
Soda Bleached	3.75	@ 4.00
Sulphate Screenings—		
Coarse	.75	@ .85
Refined	1.50	@ 1.85

Domestic Rags

New Rags

Prices to Mill f. o. b. N. Y.

Shirt Cuttings—		
New White, No. 1	11.00	@11.50
New White, No. 2	7.50	@ 8.00
Silesias No. 1	7.00	@ 7.50
New Unbleached	10.50	@11.00
Washables	4.25	@ 4.75
Fancy	5.25	@ 5.75
Blue Overall	7.00	@ 7.50
New Blue Prints	5.25	@ 5.50
New Soft Blacks	4.00	@ 4.25
Mixed Khaki Cuttings	4.25	@ 5.00
Pink Corset Cuttings	9.50	@10.00
O. D. Khaki Cuttings	5.25	@ 5.75
Men's Corduroy	4.00	@ 4.50
New Mixed Blacks	3.50	@ 3.75

Old Rags

White, No. 1—		
Repacked	5.50	@ 6.00
Miscellaneous	4.75	@ 5.25
White, No. 2—		
Repacked	3.25	@ 3.75
Miscellaneous	2.75	@ 3.00
St. Soiled, White	2.50	@ 2.75
Thirds and Blues—		
Repacked	2.25	@ 2.50
Miscellaneous	1.75	@ 2.00
Black Stockings	3.25	@ 3.75
Roofing Rags—		
Cloth Strippings	1.70	@ 1.80
No. 1	1.70	@ 1.80
No. 2	1.40	@ 1.50
No. 3	1.25	@ 1.35
No. 4	1.25	@ 1.35
No. 5A	.95	@ 1.05

Foreign Rags

New Light Silesias	6.75	@ 7.25
Light Flannelettes	7.50	@ 8.00
Unbleached Cottons	9.50	@10.50
New White Cuttings	10.00	@11.00
New Light Oxfords	7.00	@ 7.50
New Light Prints	5.50	@ 6.50
New Mixed Cuttings	3.00	@ 3.50
New Dark Cuttings	2.75	@ 3.25
No. 1 White Linens	7.00	@ 7.75
No. 2 White Linens	5.00	@ 5.50
No. 3 White Linens	4.00	@ 4.50
No. 4 White Linens	3.00	@ 3.50
Old Extra Light Prints	2.75	@ 3.00
Ord. Light Prints	2.25	@ 2.50
Med Light Prints	1.85	@ 2.10
Dutch Blue Cottons	2.25	@ 2.50
German Blue Linens	2.25	@ 2.50
German Blue Cottons	2.00	@ 2.25
Checks and Blues	1.75	@ 2.00
Lindsay Garments	1.80	@ 1.90
Dark Cottons	1.70	@ 1.80
Shoppery	1.50	@ 1.60
French Blues	2.25	@ 2.50

Old Rope and Bagging

Prices to Mill f. o. b. N. Y.

Gunny No. 1—		
Foreign	1.60	@ 1.70
Domestic	1.65	@ 1.75
Wool Tares, light	1.60	@ 1.70
Wool Tares heavy	1.60	@ 1.70
Bright bagging	1.50	@ 1.60
Small Mixed Rope	1.50	@ 1.65
Manila Rope—		
Foreign	3.50	@ 4.00
New Burlap Cut	3.00	@ 3.25
Hessian Jute Threads—		
Foreign	3.50	@ 4.00
Domestic	3.25	@ 3.50

Old Waste Papers

(F. o. b. New York)

Shavings—		
Hard, White, No. 1	3.50	@ 3.75
Hard, White, No. 2	3.15	@ 3.25
Soft, White, No. 1	2.90	@ 3.10
Flat Stock—		
Stitchless	1.25	@ 1.35
Overissue Mag.	1.25	@ 1.35
Solid Flat Book	1.15	@ 1.25
Crumpled No. 1	.80	@ .90
Solid Book Ledger	1.90	@ 2.10
Ledger Stock	1.50	@ 1.60
New B. B. Chips	.60	@ .70
Manilas—		
New Env. Cut	2.40	@ 2.60
New Cuttings	1.60	@ 1.85
Extra No. 1 old	1.25	@ 1.35
Print	.70	@ .75
Container Board	.60	@ .65
Bogus Wrapper	.75	@ .80
Old Kraft Machine Compressed bales	2.00	@ 2.15
News—		
No. 1 White News	1.50	@ 1.60
Strictly Overissue	.65	@ .75
Strictly Folded	.55	@ .60
No. 1 Mixed Paper	.40	@ .45
Common Paper	.27	@ .32

A Remarkable Range of Grades, Textures and Weights

Orr Endless Felts can now be obtained up to 86 feet in length.

With our enlarged new equipment we can now furnish Paper Manufacturers with endless felts up to 86 feet in length.

Paper Manufacturers who carefully check manufacturing costs, and also strive to produce more and better paper at a lower cost per ton, prefer the unvarying quality and long service of ORR felts. A trial of them will bring about a preference that will be lasting.

THE ORR FELT & BLANKET COMPANY, Piqua, Ohio

WE WILL BUY

Abitibi Power & Paper Co. 6s	@	102
Great Northern Paper Co.	@	258
Jessup & Moore Paper Co. Common	@	25
Paper & Textile Machinery Co 7s	@	98
St. Regis Paper Co. 6s	@	99
Suncrest Lumber Co. 6s	@	35
Ticonderoga Pulp & Paper Co. 6s	@	97½
Union Lumber Co. 6s, 1930	@	96
Watab Paper Co. 6½s	@	101
West Virginia Pulp & Paper Co. Pfd.	@	99

WE WILL SELL

A. P. W. Pulp & Power Co. 7s	@	103
Eastern Manufacturing Co. 7s, 1938	@	94
Jessup & Moore Paper Co. 1st Pfd.	@	85
Long Bell Lumber Co. 6s, 1946	@	94
Minnesota & Ontario Paper Co. 6s, 1945	@	99
Pickering Lumber Co. 5¾s	@	99
Parker Young Co. 6½s, 1944	@	97
Queen City Paper Co. 7s, 1933	@	98½
St. Lawrence Pulp & Lumber Co. 6s	@	20
United Paperboard Co. Pfd.	@	72½

Quotations Subject to Confirmation

H. D. KNOX & CO.

44 Broad St., N. Y. 27 State St., Boston

Inquiries invited on all Paper Pulp Lumber Securities

WALDRON

CENTENNIAL Waldron Machines ANNIVERSARY

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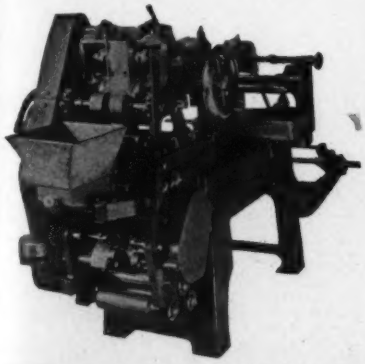
MACHINES



HIGHEST SPEED Paper Bag Machinery

Get My Quotations Before Placing Your Orders

Special Machinery Designed and Built

A. L. PARRISH,

1702 Robinson St., South Bend, Ind.

Twines

F. o. b. Mill

Cotton—			
No. 1	.26	@	.27
No. 2	.24	@	.25
No. 3	.22	@	.23
B. C., 18 basis	.36	@	.38
A. B. Italian, 18 basis	.46	@	.51
Finished Jute—			
Dark 18 basis	.24	@	.23
Light 18 basis	.27	@	.28
Jute Wrapping, 3-6 Ply—			
No. 1	.21	@	.23
No. 2	.20	@	.22
Tube Rope—			
4-ply and larger	.18	@	.19
Fine Tube Yarn—			
5-ply and larger	.23	@	.27
4-ply	.24	@	.28
3-ply	.26	@	.30
Unfinished India—			
Basis	.16	@	.17
Paper Makers Twine Balls	.13	@	.15
Box Twine, 2-3 ply	.17	@	.19
Jute Rope	.21	@	.23
Ameri. Hemp, 6	.29	@	.31
Sisal Hay Rope—			
No. 1 Basis	.18	@	.20
No. 2 Basis	.16	@	.18
Sisal Lath Yarn—			
No. 1	.16	@	.18
No. 2	.14	@	.16
Manila Rope	.24	@	.26

CHICAGO

All Rag Bond	.35	@	.41
No. 1 Rag Bond	.25	@	.35
No. 2 Rag Bond	.14	@	.25
Water Marked Sulphite Bond	.09	@	.12
Sulphite Bond	.06¾	@	.11
Superfine writing	.18	@	.24
No. 1 fine writing	.14	@	.18
No. 2 fine writing	.12	@	.14
No. 3 fine writing	.08½	@	.12
No. 1 M. F. Book	.06½	@	.07¾
No. 2 M. F. Book	.05¾	@	.06¾
No. 1 S.&S.C. Book	.06¾	@	.07¾
No. 2 S.&S.C. Book	.05¾	@	.06½
Coated Book	.07½	@	.12
Coated Label	.07½	@	.10
News—Roll, mill	.03½	@	.04¼
News—Sheets, mill	.03¾	@	.04¾
No. 1 Manila	.04¼	@	.05¾
No. 1 Fibre	.04¾	@	.05¾
No. 2 Manila	.04¼	@	.04¾
Butcher's Manila	.04	@	.04½
No. 1 Kraft	.05¾	@	.06¼
Southern Kraft	.04½	@	.05
No. 2 Kraft	.05	@	.05¼
Wood Tag Boards	.04¼	@	.06¾
Sulphite Screenings	.03	@	.03¾
Manila Tissue—			
24x36 Sheet	.07	@	.07¾
White Tissue—			
20x30 sheet	.07¼	@	.07½
Boards, per ton—			
(Delivered Central Territory—			
Plain Chip	42.50	@	45.00
Solid News	45.00	@	47.50
Manila Line Chip	55.00	@	57.50
Container Lined—			
(Delivered Central Terriory)—			
85 Test	65.00	@	70.00
100 Test	70.00	@	75.00

Old Papers

F. o. b. Chicago

Shavings—			
No. 1 Hard White	3.60	@	3.70
White Env. Cuttings	3.60	@	3.70
No. 1 Soft Shavings	2.90	@	3.00
No. 1 Mixed	1.35	@	1.45
No. 2 Mixed	1.05	@	1.10
Ledger & Writings	1.45	@	1.60
Solid Books	1.20	@	1.30
Blanks	1.65	@	1.75
Krafts	1.80	@	1.90
New Kraft Cuts	2.25	@	2.35
Manila Envelope Cuttings	2.00	@	2.10
Ex. No. 1 Manila	1.55	@	1.65
Print Manila	.75	@	.85
Folded News (overissue)	.75	@	.85
Old Newspapers—			
No. 1	.65	@	.70
No. 2	.55	@	.60
Mixed Papers—			
No. 1	.60	@	.65
Roofing Stocks—			
F. o. b. Chicago, net cash			
No. 1	30.00	@	—
No. 2	28.00	@	—

BOSTON

Paper

F. o. b. Mill

Ledgers—			
Sulphite	.07½	@	.15
Rag content	.15	@	.30
All rag	.38	@	.52½
Bonds—			
Sulphite	06½	@	.11½
Rag content	.15	@	.30
All rag	36½	@	.55
Writings	.07	@	.20
Superfines	.22	@	.50
News	.04	@	.04½
Book, Super	.07	@	.10
Book, M. F.	.06¾	@	.09¾
Book, Coated	.08½	@	.20
Coated Litho	.09	@	.12
Label	.09½	@	.15
Jute Manila No. 1	.11	@	.13
Manila, Sul. No. 1	.04¾	@	.06½
Manila, Sul. No. 2	.03¾	@	.04½
No. 1 Kraft	.06	@	.06½
No. 2 Kraft	.05	@	.05¾
Common Bogus	.02½	@	.02½
Delivered New England points			
Straw Board			57.50
Filled News Board			47.50
Chip Board			45.00
Single Manila Pulp lined board	55.00	@	60.00
Single White, patent coated board bender	75.00	@	80.00
Wood Pulp Board	80.00	@	85.00
Binder Boards	70.00	@	75.00
(F. o. b. Mills)			
Tarred Felts—			
Regular	61.00	@	63.00
Slaters	66.00	@	68.00
Best Tarred, 1 Ply roll	1.50	@	1.60
Best Tarred, 2 Ply, roll	1.70	@	1.80
Best Tarred, 3 Ply, roll	2.00	@	2.10

Old Papers

Shavings—			
No. 1 Hard White	3.25	@	3.75
White Blank News	1.55	@	1.65
Manila Env. Cuttings	2.00	@	2.25
No. 2 Hard White	3.00	@	3.25
No. 1 Soft White	.03	@	.03¼
No. 2 Soft White	02½	@	.03
No. 1 Mixed	1.10	@	1.15
No. 2 Mixed	.85	@	.90
Solid Ledger Stock	1.90	@	2.00
No. 1 Books, Heavy	1.15	@	1.25
No. 1 Books, Light,	—	@	1.25
No. 1 New Manila	2.25	@	2.50
No. 1 Old Manila	1.50	@	1.75
Print Manila	.85	@	.95
Old Kraft	2.20	@	2.30
Overissue News	.65	@	.75
Old Newspapers	.62½	@	.67½
No. 1 Mixed Paper	.45	@	.52½
Box Board, Chip	.45	@	.60

Bagging

Price f. o. b. Boston

Gunny No. 1—			
Foreign	1.37½	@	1.50
Domestic	1.60	@	—
Manila Rope—			
Foreign	4.00	@	—
Domestic	4.50	@	5.00
Mixed Rope	1.25	@	—
Scrap burlaps	1.35	@	—
Wool Tares, heavy	1.50	@	1.30
Mixed Strings	1.20	@	1.30
New Burlap Cutting	2.50	@	2.75

Domestic Rags (New)

Price f. o. b. Boston

Shirt Cuttings—			
New White No. 1	.11½	@	—
Silesias, No. 1	.07	@	—
New Unbleached	.10	@	—
Fancy	.05½	@	—
Washable	.04½	@	—
Cottons—According to Grades—Blue—			
Blue Overalls	07	@	—
New Black, soft	3.50	@	4.00
Khaki Cuttings	.04½	@	.05½
Corduroy	.03½	@	.04
New Canvas	.09	@	.10

Domestic Rags (Old)

Price f. o. b. Boston

White No. 1	5.50	@	—
Repacked	6.25	@	6.50
Miscellaneous	5.00	@	—
White No. 2—			
Repacked	.04½	@	.05
Miscellaneous	.03½	@	.04
Thirds and Blues—			
Repacked	2.60	@	—
Miscellaneous	2.15	@	2.25
Roofing Stock—			
No. 1	1.70	@	1.75
No. 2	1.45	@	1.55
No. 3	1.15	@	1.25
No. 4	1.15	@	1.25

PHILADELPHIA

Paper

F. o. b. Mill

Bonds	.07	@	.40
Ledgers	.11	@	.40
Writings—			
Superfine	13	@	.18
Extra fine	—	@	.22
Fine	.20	@	.26½
Fine, No. 2	.16	@	.25
Fine, No. 3	.12	@	.20
Book, M. F.	.06¾	@	.07
Book, S. S. & C.	.06	@	.07½
Book, Coated	.11	@	.16
Coated Lithograph	.09	@	.12
Label	.09	@	.12
News	.03¾	@	.04
No. 1 Jute Manila	.09½	@	—
Manila Sul., No. 1	.04½	@	.06
Manila, No. 2	.04	@	.04½
No. 2 Kraft	.05	@	.05¼
No. 1 Kraft	.06	@	.06¼
Common Bogus	.02¾	@	—
Straw Board	55.00	@	56.00
News Board	40.00	@	42.50
Chip Board	37.50	@	40.00
Wood Pulp Board	4.50	@	5.00
(Carload Lots)			
Binder Boards—			
No. 1, per ton	85.00	@	90.00
No. 2, per ton	70.00	@	75.00
Carload lots	60.00	@	65.00
Tarred Felts—			
Regular	66.00	@	58.00
Slaters	70.00	@	72.00
Best Tarred, 1-ply (per roll)	1.85	@	1.95
Best Tarred, 2-ply (per roll)	1.55	@	1.70
Best Tarred, 3-ply	2.10	@	2.15
No. 1 Mixed Paper	.65	@	.70

Domestic Rags (New)

Price to Mill, f. o. b. Phila.

Shirt Cuttings—			
New White, No. 1	.11½	@	.12
New White, No. 2	.07	@	.07½
Light Silesias	.07	@	.07½
Silesias, No. 1	.07½	@	.08
Black Silesia, soft)	.05	@	.05½
New Unbleached	.11	@	.11½
Washable	.05	@	.05¼
Fancy	.05½	@	.06
Cottons—according to grades—			
Blue Overall	.07½	@	.08
New Blue	.03½	@	.04
New Black Soft	.05½	@	.06
New Light Seconds	.03	@	.03½
Khaki Cuttings	.05	@	.05½
Corduroy	03½	@	.03¾
New Canvas	.08	@	.09
New Black Mixed	.05	@	.05½

Bagging

F. o. b. Phila

Gunny, No. 1—			
Foreign	3.50	@	4.00
Domestic	3.25	@	3.50
Manila Rope	4.25	@	4.50
Sisal Rope	1.25	@	2.00
Mixed Rope	1.25	@	1.50
Scrap Burlaps	2.00	@	2.25
Wool Tares, heavy	2.00	@	2.25
Mixed Strings	1.75	@	2.00
No. 1, New Light Burlap	3.25	@	3.50
New Burlap Cuttings	3.25	@	3.50

Old Papers

F. o. b. Phila.

Shavings—			
No. 1 Hard White	3.50	@	3.60
No. 2 Hard White	3.00	@	3.25
No. 1 Soft White	2.80	@	2.90
No. 2 Soft White	1.90	@	2.00
No. 1 Mixed	1.50	@	1.60
No. 2 Mixed	.90	@	1.00
Solid Ledger Stock	1.90	@	2.00
Writing Paper	1.65	@	1.75
No. 1 Books, heavy	1.15	@	1.20
No. 2 Books, light	.80	@	.85
No. 1 New Manila	2.40	@	2.50
No. 1 Old Manila	1.50	@	1.60
Print Manila	1.00	@	1.10
Container Manila	.90	@	1.00
Old Kraft	2.00	@	2.20
Common Paper	.50	@	.60
No. 1 Mixed Paper	.60	@	.70
Straw Board, Chip	.75	@	.80
Binders Board, Chip	.75	@	.80
Overissue News	.80	@	.90
Old Newspaper	.60	@	.70

Domestic Rags (Old)

White, No. 1—			
Repacked	5.00	@	5.25
Miscellaneous	4.75	@	5.00
White, No. 2—			
Repacked	.03½	@	.04
Miscellaneous	.02	@	.02¼
Thirds and Blues—			
Repacked	2.50	@	2.75
Miscellaneous	1.75	@	2.00
Black Stockings	3.25	@	3.50
Roofing Stock—			
No. 1	1.55	@	1.65
No. 2	1.40	@	1.50
No. 3	1.25	@	1.35
No. 4	1.20	@	1.30
No. 5A	.90	@	1.00
B	.80	@	.90
C	.80	@	.90

TORONTO

Paper

F. o. b. Mill

Bond—			
No. 1 Sulphite	.12½	@	—
No. 2 Sulphite	.10¾	@	—
No. 1 Colored	.13½	@	—
No. 2 Colored	.11¼	@	—
Ledgers (sulphite)	—	@	—
Ledgers, No. 1	.36	@	—
Ledgers, No. 2	.27	@	—
Writing	.09¾	@	—
News f. o. b. Mills—			
Rolls (Carloads)	3.25	@	—
Sheet (carload)	3.75	@	—
Sheets (2 tons or over)	4.00	@	—
Book—			
No. 1 M. F. (carloads)	7.75	@	—
No. 2 M. F. (carloads)	7.50	@	—
No. 3 M. F. (carloads)	7.25	@	—
No. 1 S. C. (carloads)	8.25	@	—
No. 2 S. C. (carloads)	8.00	@	—
No. 3 S. C. (carloads)	7.75	@	—
No. 1 Coated and litho	14.50	@	—
No. 2 Coated and litho	13.50	@	—
No. 3 Coated and litho	12.75	@	—
Coated tinted	.15	@	—
Wrapping—			
Rag Brown	4.85	@	—
White Rag	5.25	@	—
"B" Manila	5.65	@	—
No. 1 Manila	6.65	@	—
Fiber	6.65	@	—
Kraft, M. F.	7.20	@	—
M. G.	7.35	@	—

Pulp

(F. o. b. Mill)

Ground wood	28.00	@	32.00
Sulphite easy bleaching	63.00	@	60.00
Sulphite news grade	55.00	@	60.00
Sulphite, bleached	80.00	@	—
Sulphate	65.00	@	—

Old Waste Paper

(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut	3.60	@	—
Soft White Book Shavings	3.00	@	—
White Blk., News	1.50	@	—
Book and Ledger—			
Flat Magazine and Book Stock (old)	1.25	@	—
Light and Crumpled Book Stock	1.10	@	—
Ledgers and Writings	1.40	@	—
Solid Ledgers	1.40	@	—
Manilas—			
New Manila Cut	1.50	@	—
Printed Manilas	1.00	@	—
Kraft	2.25	@	—
News and Scrap—			
Strictly Overissue	.80	@	—
Folded News	.80	@	—
No. 1 Mixed Papers	.60	@	—

Domestic Rags

(Price to mills, f. o. b. Toronto)

No.1 White Shirt Cuttings	.10½	@	—
Fancy Shirt Cuttings	.05	@	.05½